The OIL AND GAS JOURNAL

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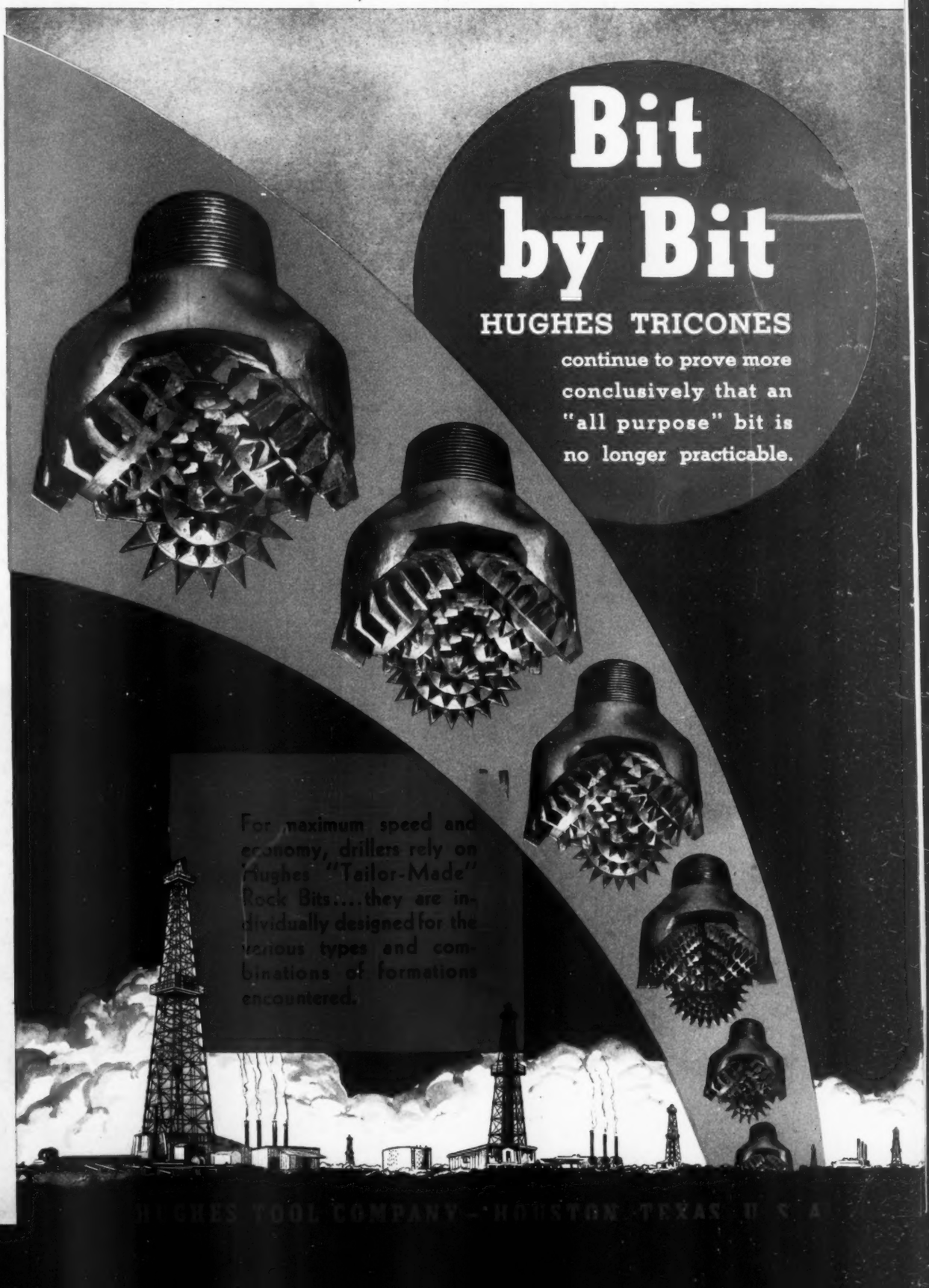
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UNION 6x19 Filler Wire Rotary Drilling Line, Hemp Center

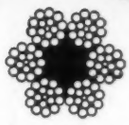

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Photo shows The Southwest Petroleum Company's No. 1-A Senopulo Lease, Oklahoma City, being drilled by Jim O'Connor Drilling Company. Left to right, the men are: Gene Bodley, Jarecki Mfg. Co.; L. P. Nixon, Union Wire Rope Corp.; Jim O'Connor, Byron Hooks, Bill Blair, Frank Folger, Jim Ragsdale, Bob Lemaster, J. B. Davis.

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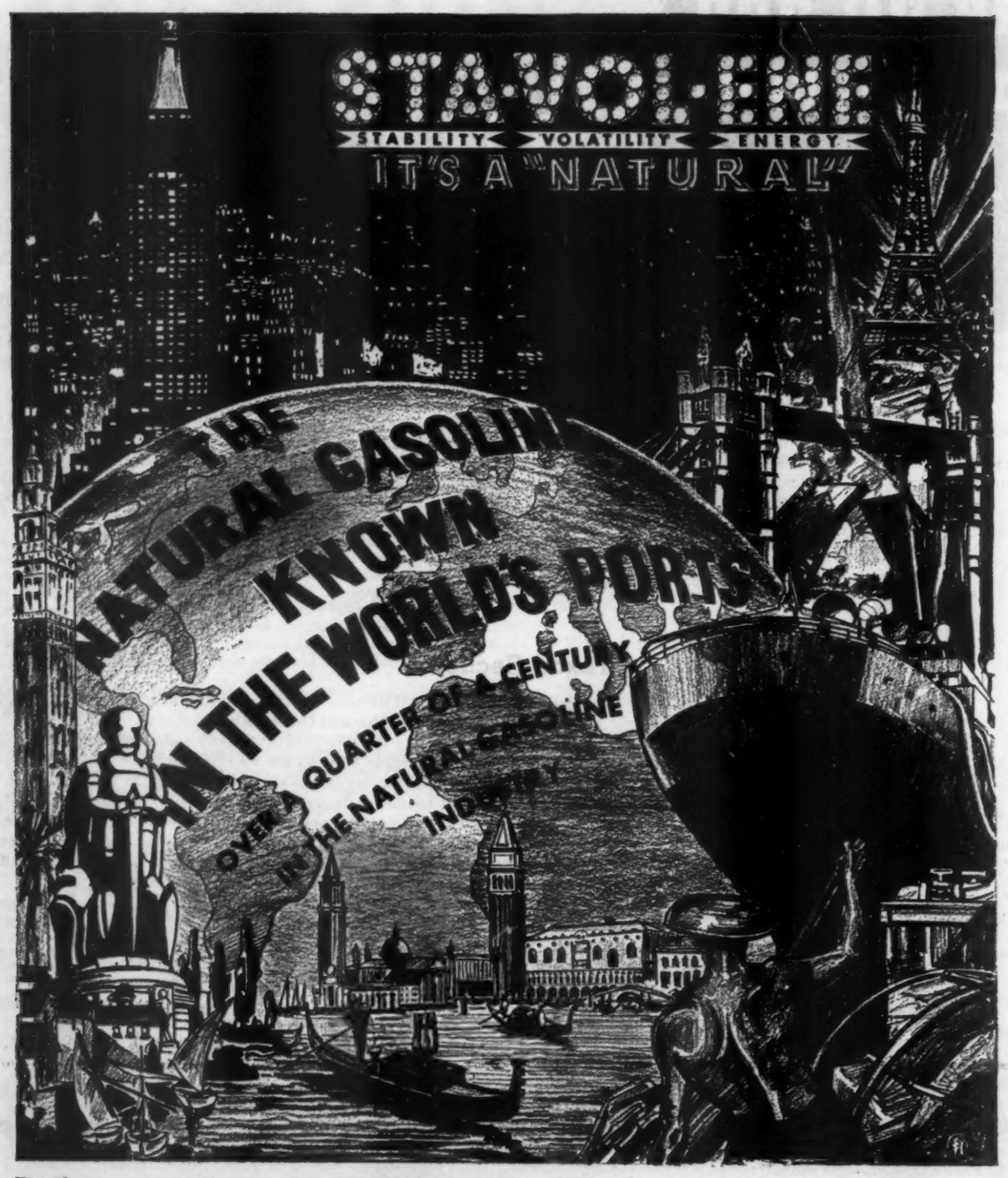
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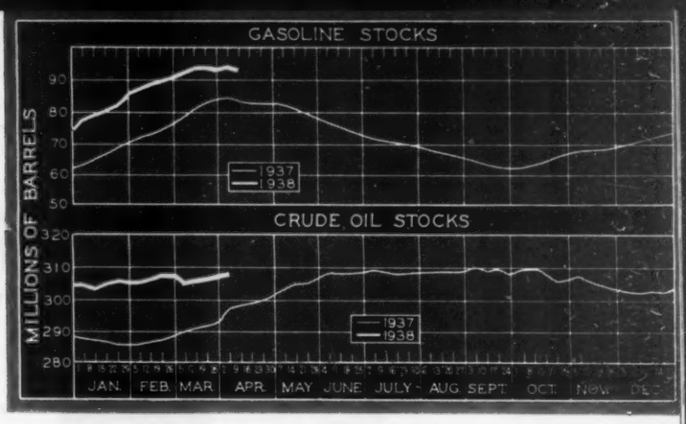


Reports on Consumption Better

THE latest reports covering demand for petroleum products show an encouraging trend in this and foreign countries. They serve to nullify pessimistic predictions heard in some quarters several months ago and point to a satisfactory consumption throughout the entire year. Elsewhere in this issue is published a summary of the demand for crude oil and its refinery products for the first two months of this year. Based on past experience these data for January and February indicate what is to be expected the remainder of the year. They show definitely that the oil business is not faced with substantial decreases in outlets for its finished products as is the case in other major industries.

CRUDE PRODUCTION *3,392,636 barrels daily average—up 27,027 barrels.*

CRUDE STOCKS *308,237,000 barrels as of April 2—up 680,000 barrels.*

GASOLINE STOCKS *92,279,000 barrels as of April 9—down 645,000 barrels.*

REFINERY RUNS *3,110,000 barrels daily week ending April 9—down 35,000.*

In the domestic end, gasoline shipments for the two months were 2.1 per cent ahead of last year's with a 25 per cent gain in exports, which resulted in a total demand increase of nearly 4 per cent. This in effect means that the industry the first 59 days of this year had the largest gasoline market in its history for that period. Total demands for kerosene, gas oil and distillate also ran ahead of last year's. Domestic outlets for petroleum wax were greater than last year's, but a 45 per cent decrease in exports caused a drop in total shipments.

Falling off in demand so far this year has been in the residual fuel oils and lubricants. Both reflect the recession in general business activity which has brought reduced purchases from industries, railways, public utilities, and marine uses. The actual demand for motor oils is estimated to be about the same as last year.

Probably the most encouraging feature of these demand figures applies to the heavy export shipments. It was feared that last year's large shipments to foreign consumers would not be duplicated in 1938. There has been a decrease in shipments to Japan, which has affected West Coast markets, but this decline has been more than offset in the movement to other countries. For the two months the gain in exports was 26 per cent, the increase absorbing 100,000 barrels daily of additional crude oil and refinery products.

Developments so far indicate that substantial reductions in crude oil output will have to be made the second half of April if production for the month is to be brought below the March average, which was the objective at the start of the month. Production continues to run substantially in excess of estimated requirements in Oklahoma and Louisiana with California output far in excess of needs.

Daily Average Production for Week

	April 9 1938	Bur. Mines Apr. est.	April state allowable	April 2 1938
Oklahoma City	137,300			102,700
Fitts	55,800			59,725
Remainder of state	324,900			329,450
Total Oklahoma	518,000	526,500	475,000	491,875
East Texas	430,598			429,700
West Texas	193,100			191,950
North Central Texas	106,550			101,549
Texas Panhandle	57,552			66,648
East Central Texas	101,500			98,947
Gulf Coast Texas	330,100			325,800
Southwest Texas	103,950			106,298
Total Texas	1,323,350	1,329,800	1,308,959	1,320,892
North Louisiana	79,175			80,265
Gulf Coast Louisiana	181,050			182,200
Total Louisiana	260,225	239,800	252,275	262,465
California	713,500	698,700	698,700	702,750
Kansas	158,875	173,000	173,000	166,375
Arkansas	53,490	40,000		54,400
Eastern fields	141,800	132,600		140,850
Michigan	52,326	51,400		52,832
New Mexico	108,000	106,000	105,100	105,110
Rocky Mountain area	63,070	63,900		68,060
Total United States	3,392,636	3,361,700		3,365,609

Increase, 27,027 bbls. daily.

Trends in the

By COL. E. O. THOMPSON

Chairman of Interstate Oil Compact Commission

(Written Exclusively for the Texas Number of The Oil and Gas Journal)

Proration of the production of oil and gas can remain successful, both as a theory and as applied law, only so long as it keeps apace with developments.

It must be elastic, capable of expanding and of adjustment. It must be ready to discard the old for the new. It must be applied generally.

With this idea in mind, I see these broad outlines for the future direction of proration:

1. Expansion into other states. Texas conceived and has fostered proration. For the future, and to prevent the collapse of the foundations Texas has laid, the other states must build.

2. A consideration of the effects of proration upon general economics. At present there seems to be a tendency for proration, in actual practice—and, no doubt, influenced by other economic conditions--to encourage surpluses. History tells us that surpluses lead to depressions.

3. Application of new scientific principles as rapidly as we learn and prove their soundness.

I cannot select between these three for importance. I can point out the importance of each.

First let us consider how necessary it is that the proration program be all-inclusive in at least its broadest aspects.

Currently in Texas we are faced with this problem: Major producers step across the Texas line into Louisiana and produce three and four times as much oil from the same type of well as in Texas. In Texas, these same companies laud conservation; they follow our regulations sedulously; they advise with us, give us their best engineering minds to prove the wisdom of what we are doing.

It occurs to me forcibly that if what we do for the Texas Co. or the Standard, or Gulf, is good for them in Texas, it is equally good for them in Louisiana, in Oklahoma, in California. I will go so far as to say that Texas feels she has done more than her share towards assuming the brunt of proration. Texas cannot understand why proration is good in Texas and not so good in Louisiana, particularly when the latter state has a tax of 11 cents per barrel, against our tax of 4 cents. We believe the companies should show the same vigilance in conserving their reservoir energies, in obtaining ultimate consumption, in one state as in another. The fact of the 11 cents tax being coincident with higher per well allowables forcibly suggests that the Texas tax may be too low. I can see no sound reason for it inspiring a producer to differentiate in his methods as between states, but there may be reasons unknown to me. Proration may, in the future, be tied in with tax rates and to get per well allowables comparable with those in Louisiana, perhaps we in Texas should assess higher taxes.

But to return to the subject of interstate proration, undoubtedly we are making strides forward in that direction. Perhaps the word "stride" should be modified to "creeping." It sometimes seems that way to Texas producers. In any event, other states are slowly following Texas; they are taking advantage of things we learned the hard way. But it is a fact which should be self-evident, that controlled production, and controlled waste prevention—physical and economic waste—will be completely successful only when all states cooperate fully in the fundamentals of the program.

The economics of proration is a field so broad that I have determined it shall have a major place on the agenda of the Interstate Oil Compact Commission. At the forthcoming meeting in Wichita, Kans., April 29 and 30, I have asked four outstanding economists to deliver papers on this subject—Alexander Sachs of New York, whose paper at the recent geological meeting in New York, attracted so much interest; Joe Pogue of New York, Dr. R. A. Stienmayer of Tulane, and F. B. Plummer, head of the University of Texas' bureau of economic geology.

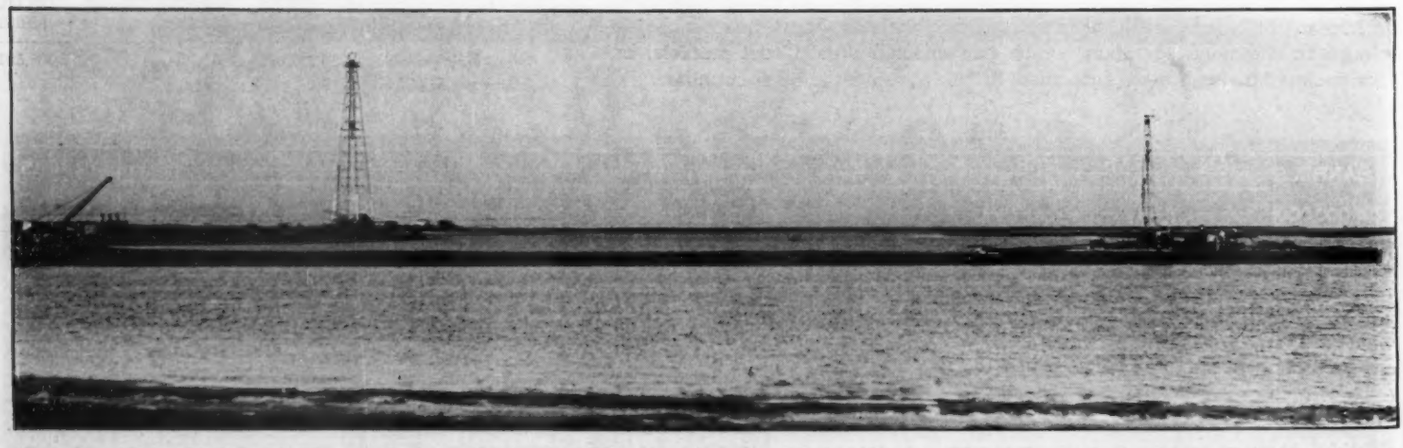
So that we may get as much information as possible from these experts in their respective fields, I have requested that they consult with each other with a view to having no overlapping in their papers.

I spoke of Doctor Sachs' paper at the A.I.M.M.E. meeting in New York particularly because of his suggestion that the oil states ought to have an economic "planning board," perhaps selected by the regulatory authorities of the states from a list nominated by the industry. While basically in agreement with Doctor Sachs—in Texas we have been looking at the economic aspects of proration for a long time—I would suggest that no unchanging board be set up; rather, that we draw upon all the specialists as their information is available, in the manner in which we will draw upon them at the next compact meeting.

The economic effects of proration—and its trends—are of current significance due to our large overstocks—in fuel oil, in gasoline and in crude. I need cite no figures here; they are well known to all. But I do need to make this observation: Equally as alarming as the surpluses is the fact that those surpluses might be chargeable to proration.

If they may be so charged, then it becomes incumbent upon the regulatory authorities to determine wherein lies the error which allowed the condition to develop. Hence my earlier statement that one of the future trends necessarily must be the relation of conservation to economics. It is a broad field and one which I am not fully equipped to discuss at this time; nevertheless it is one to which the oil regulatory official, not only in Texas but in all the states, must look if we are to be completely successful in our task.

The third subdivision which I arbitrarily made is, of course, the one in which we are interested from day to day. But before passing to it let me emphasize that the first two are of equal, if not of surpassing importance. The peculiarities of human nature, which afflict all of us; the intricacies into which we run when we tamper with the law of supply and demand, require their consideration if the structure of proration is to be maintained. That proration is good is no longer open



Extending Flour Bluff field (Nueces County, Texas Gulf Coast) in Laguna Madre (Corpus Christi Bay). In background Sinclair Prairie Oil Co. rigging up for test on artificial island. At right, building island for second Sinclair test. Roadway to shore shown

Proration of Oil and Gas

COMPLETE PANORAMA OF TEXAS PETROLEUM

A special section starting on page 75 is devoted to developments in the Lone Star State covering production, transportation, refining, natural gasoline, natural gas and carbon black.

to question. We in Texas have proved that science can be applied to oil production as to any other form of production, with great ultimate good. But we cannot always restrict our view to the ultimate good. We must also consider the practical exigencies in each situation. There must be national unity in proration, else there will be rebellion against it. There must be no trends which will lead us into another depression.

How proration keeps pace with changing conditions may best be illustrated by examples.

You may have read a recent paper discussing the salt water problem, particularly as it applies to East Texas. I want it understood, in this article, that the salt water problem is not news to the Texas Railroad Commission. We have been gravely concerned about it for months. We have called for the best minds to work on the problem.

In January I challenged the engineers to solve this water problem. The result is two possibilities for a new twist to proration:

Possibility No. 1 is proration of the fluid content of the reservoir, rather than proration of the oil. This has been discussed at our statewide meetings where oil men meet to exchange views and thresh out their common problems. Our engineers have worked out the amount of space occupied in the reservoir by a barrel of oil, by a barrel of water, and on this basis would be able to fix the allowables in short order, to the end that the withdrawals of the fluid content would be substantially equal and uniform.

Possibility No. 2, and the possibility we hope will eventuate, is making water repressuring practical. An experiment well is now being operated on this basis, and engineers have succeeded in returning the water to the producing formation at the same time as the oil is produced. The water is returned before it is oxidized by contact with the outer air, and the operation is continuous. Whether it will be feasible on a field-wide scale, we cannot at this time say.

Still a third possibility is that by squeeze jobs we shall be able to cut down water production. Considerable success already has been achieved. One well with which I am familiar reduced the water from 90 per cent to 3 per cent of fluid production.

In any event, the point is that the commission—and the industry—is working on the problem as we have worked on many another before.

In connection with water repressuring, I should note the success with gas repressuring. A particularly fine example is not in Texas but in Oklahoma. The experiment was carried out under happy circumstances in that the land was Indian land so that no ownership problems were involved. It might be difficult to persuade a private owner with a high gas-oil ratio well to consent to closing it in to better general conditions throughout the field. The significance of the Oklahoma experiment is not in the fact that the experiment was made, but in the knowledge which was obtained from it.

We have several such repressuring experiments under way in Texas. The commission's part in these is to sanction and encourage them, considering them to be a part of the conservation of oil and gas. One in particular involves the repressuring of stripped gas which is certainly a laudable conservation undertaking.

For a broader possible future trend of conservation and proration, I submit this possibility: A new method of proration. This proposal, which the commission is studying, is that we wipe the slate clean of present proration methods and establish a uniform method for the entire state in so far as it is applicable.

Under the proposed plan—which, so far, is a possibility rather than a probability—each well in the state would be assigned its irreducible minimum—either the statutory limit set for marginal production, or actual production which is less than the marginal. New potentials would be taken. The state allowable would be determined; then the amount needed to supply the marginal allowance, and the balance prorated on a proportional basis among all wells in proportion to potential.

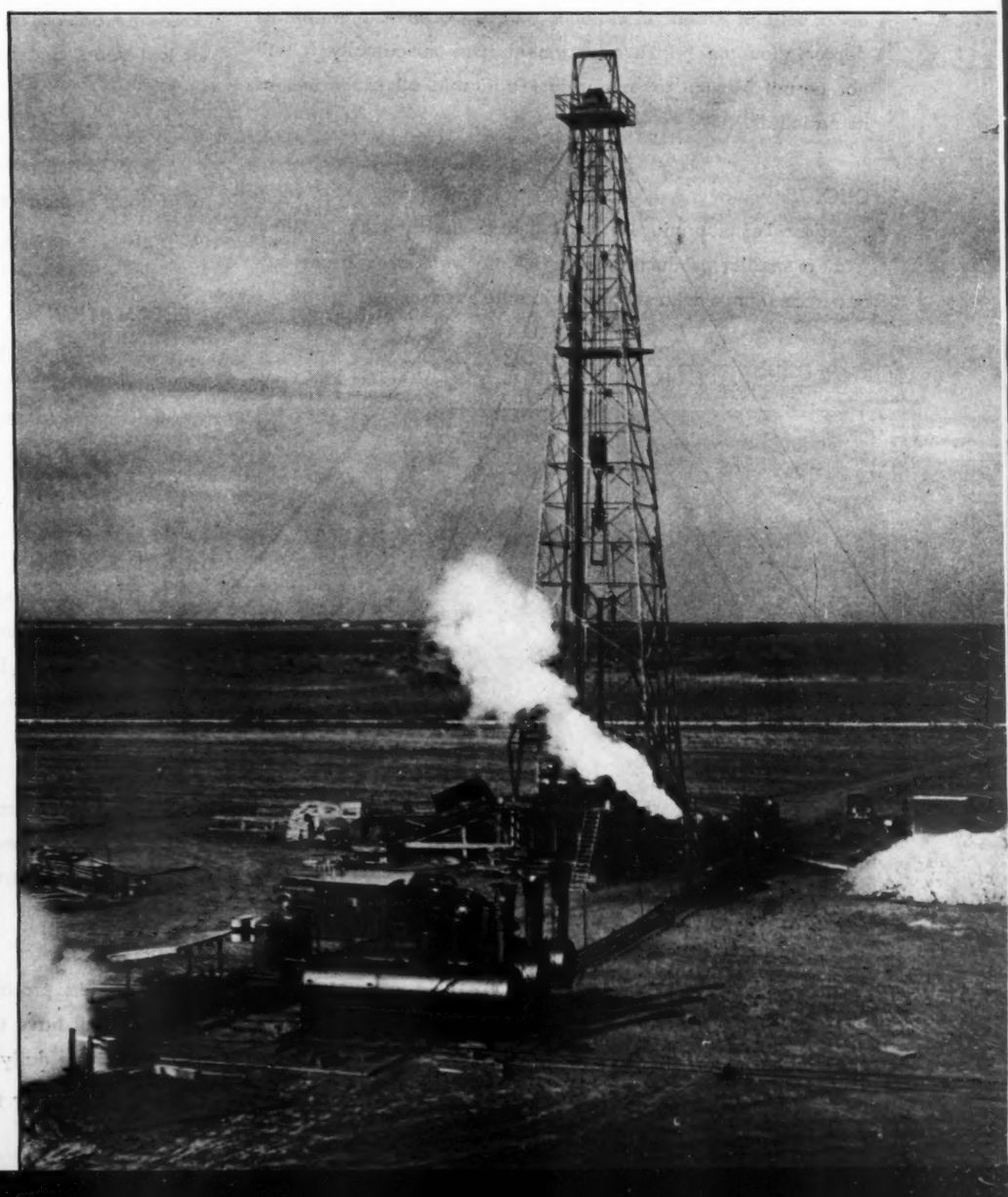
The key of this plan would be new potentials on all wells. Many a well is going on old potentials, like the man who still thinks he can chin himself 16 times because he could as a boy.

These are but suggestions and outlines. We can only say that the practical day by day problems will be met as we reach them.

In closing I want to say one more thing: If nothing else, proration has proved that we have no need for alarmists. There is a difference between the man who examines all things with a critical eye and he who on slightest provocation shouts "wolf." We have had plenty of recent examples. I recall vividly the alarm when the Rodessa field was brought in. Why you would have thought the world was going to end tomorrow. Recently we have been treated with headlines about the reserves being fast depleted. That's the oldest cry of the alarmists and it comes at a time when we are genuinely concerned over what to do with the oil aboveground without worrying about whether there's enough below.

I believe that the regulatory officials of all the states are fairly honest men of fairly high levels of intelligence, willing to work for the common good and that we'll surmount all our problems as we get to them.

Drilling in Turkey Creek field, Nueces County, Lower Texas Gulf Coast



SPARKS FROM THE NEWS

DOLLAR PER BARREL TAX

Standard of Indiana in 1937 sold 100,000,000 barrels of products and paid $103,924,000 taxes. The taxes were 50 per cent more than wages paid 32,000 employes.

THAT'S SO

Excessive gasoline stocks, overproduction of crude, and Madison trials are not the only things that can upset markets. There's the weather.

DIFFERENCE

While the administration at Washington talks generally about settling American claims on a basis of investment minus depreciation the British government says specifically it will not permit Mexico to expropriate valuable oil properties of its nationals.

CHOICE

East Texas producers must decide shortly whether they want a smaller production from flowing wells or a larger output from pumps with a lower ultimate recovery.

CHRISTENING GEORGIA'S DEEP TEST

Acme

President R. E. Wilson of Pan American Petroleum & Transport Co. (right) watches Governor E. D. Rivers break a bottle of East Texas crude on drill pipe at spudding, Pierce County, Georgia

FOREHANDED

Foreseeing higher prices, thrifty jobbers are buying gasoline to meet current needs instead of drawing on stocks they built up just before the raise in freight rates.

HIGH-COMPRESSION TRACTORS

The new Ford tractor is equipped with a high-compression motor. It may bring about changes in tractor fuel specifications.

CRAPE-HANGERS

B. of M. report this week shows total demand for gasoline, kerosene, gas oil, and distillate first two months running ahead of last year. Sad news for the crape-hangers.

EXPORTS UP

Gulf Coast refiners and marketers are more optimistic regarding refined oil prices. A strong export market is the answer.

RECLAMATION

Reclaimed oils are as good as the fresh lubricants, says the Federal Trade Commission in filing a complaint. The commission forgot to add there are wide variations in reclaiming operations with just as wide a range in the quality of their finished products.

SOUND ADVICE

A.P.I. in a statistical study advises refiners so to conduct their individual operations that their individual operations that their stocks on July 1 will not be larger than they were on the same date last year.

FROM THE AIR

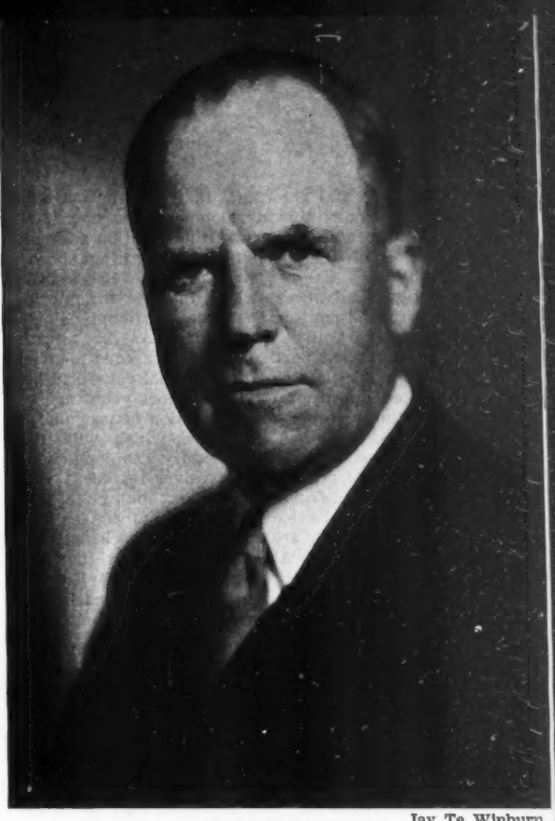
Photography from the air has advanced to the point where now it is saving geologists, land men, and field men many miles of difficult travel on the ground.

INADEQUATE

California proration officials, faced with an emergency situation, still have to reduce current crude production about 100,000 barrels daily to balance with requirements.

Trend in Petroleum Derivatives

By CARLETON ELLIS



Jay Te Winburn

CARLETON ELLIS

A Job for "Crystal Gazers"

We asked Carleton Ellis to tell us about the trends within the manufacturing phases of the oil industry which point to further expansion in the production of chemicals from petroleum. Only "crystal gazers" would predict the future, says Mr. Ellis, who gives in this paper a summary of known developments in language a layman can understand.

Mr. Ellis, who conducts a research laboratory at Montclair, N. J., is widely known as an investigator who has been associated with the development of cracking and several other processes in refinery operations. He has taken out approximately 700 patents. He is the author of several scientific books and numerous papers which are part of the permanent literature of the industry.

Not so many years ago the petroleum refiner was one who occupied himself almost entirely with the refining of crude oil for the production of commodities such as gasolines and lubricating oils for internal combustion engines, kerosene for illuminating and heating purposes, paraffin wax, and asphalt and various road oils. Times have changed, and the petroleum technician, like any other wide awake scientist, has followed suit. In contrast to those days when the refiner would have hesitated to even suggest producing anything other than products already indicated, at the present time even many allied scientists would marvel at the number of diversified products that emerge from the petroleum chemist's laboratory. Perhaps the day may even come when it can be unfearingly said that the petroleum refiners "make gasoline, too."

If we stop to consider, though, it is plainly evident why this has come to pass. The petroleum chemist, like any other true researcher, is possessed with the urge to "make hash of the scraps," although in many cases this "hash" has turned out to be a delicacy, to say the least. As has often been said, the by-products are the lifeblood of any industry, and the petroleum chemist has merely done, in bringing along petroleum refining to its present state of development, just what any person with creative tendencies would have been expected to do. As an indication of the widespread interest in the chemical derivatives of petroleum, it might be mentioned that the recently published second volume of "The Chemistry of Petroleum Derivatives," by the writer, dealing with developments since the end of 1934, is a larger book than the first volume, which dealt with the entire progress in that branch of science prior to 1914.

During recent years ethylene has proven one of the most prolific of raw materials known to the chemist. Today its importance in the production of ethyl alcohol and diethyl ether, of the ethylene glycols, nitroglycerin substitutes, vesticant mustard gas (dichlorodiethyl sulfide), and of a host of other useful products, is common knowledge. Neither can the all-important ether and ester solvents, for example, ethylene glycol, mono-ethyl ether and the acetate of the latter material, be overlooked. Belonging to this vast family are the ethanolamines which, during the "depression years," rose to such importance in the field of emulsifying agents.

At present ethylene and the other olefins continue to serve as starting materials in syntheses on which the chemical industries of the future may depend. A great deal of attention is being focussed on the co-polymerization of ethylene, and its gaseous homologues, with other hydrocarbons for the production of improved motor fuels. For example, when these olefins are condensed with benzene, using a phosphoric acid catalyst, or with naphthenes, employing aluminum chloride as catalyst, high antiknock fuels are produced. Phenols undergo similar condensation with ethylene, etc., the resulting alkylated phenols being suggested as useful for inhibiting gum in gasolines, as anti-aging agents for rubber, and many other purposes.

The question of aviation fuels has demanded much attention and research on the part of the petroleum chemist. This has come to exist because of the "air-minded" world of today, with its only too cognizant understanding not alone of the dependence of the commerce of the future on aviation, but also of the latter's poignant relationship to national defense. The appeal therefore has been for higher and higher octane-number fuels which will cope with the high compression engines of present-day aeronautical design.

Aviation Fuels

Possibly the most important "new" contribution to this type of fuel has been the presentation of a blending agent, for aviation fuels, which chemically is isopropyl ether. This material, though possessing a boiling point below benzene, nevertheless has a vapor pressure which brings it within the specifications for aviation fuels. It is well known that diethyl ether is a knock producer for gasolines, so that it is all the more astounding that isopropyl ether should play an opposite role to its close kin. Ordinary commercial aviation gasoline blended with 40 per cent of isopropyl ether and a maximum of 3 cc. of lead tetraethyl per gallon, gives a 100-octane rating airplane fuel. A decided advantage possessed by this blend is that it affords a fuel consumption of 13 per cent less than that on 92-octane regular gasoline. This is an extremely important consideration, since the question of cruising range of a ship is always a vital one, especially in times of war.

As regards availability it is estimated that in case of a national emergency all the requirements could be cared for by a potential production of isopropyl ether of nearly a half billion gallons per year.

During recent years, and for that matter at present, some individuals have predicted a petroleum shortage and pictured the world being left in a state of paralysis because of no means of operating gasoline engines. As a result many persons apparently have been thrown into a state of mental unrest, while the remainder have been content to accept the old bromide that "when the time comes, there'll be a way."

Polymer Gasoline

Now, whether or not the petroleum refiner will be able to "find a way" to get along entirely without petroleum, in the event of an exhausted supply, he is nevertheless doing his part to conserve all the refinery fractions possible. One of his latest advances has been to convert refinery still gases, much of which were formerly used for heating purposes about the refinery or burned into the atmosphere, into what has come to be known as polymer gasoline. These so-called "waste gases" are put through a cracking operation and the unsaturates therefrom polymerized and, in some instances, subsequently hydrogenated to produce high octane gasoline. As a specific example, isobutylene can be separated from these mixed gases, polymerized and hydrogenated to give 100-octane gasoline represented by 2,2,5-trimethylpentane. In 1935 it was estimated that the potential supply of polymer gasoline (on basis of available gases) in the United States alone was over nine billion gallons. In 1936 there were reported in operation, or under construction, enough commercial units to produce 157,000,000 gallons of 80- to 100-octane polymer gasoline a year, the average octane rating for ordinary gasoline being about 66. The present day trend toward faster automobiles, faster trucks, and faster airplanes makes this new improvement in gasoline manufacture not only appropriate but necessary.

More recently a study has been made on the antiknock properties of iso-decanes which were prepared by polymerization in the presence of sulfuric acid, and subsequent hydrogenation, of the amylenes and amyl alcohols. In this way fuels were obtained which possessed even higher antiknock rating than does isooctane.

With attention during the past decade being drawn so closely to the "long molecule," it seems that every chemist sooner or later turns to the preparation of a synthetic resin or a synthetic rubber. The petroleum chemist has followed suit with his contribution, again selecting his starting point in the field of unsaturates. By treating isobutylene, obtained from cracking still gases, with polymerizing agents high molecular weight substances result which may be viscous liquids or stiff rubbery materials, depending on the extent of polymerization.

These long olefin polymers may range in molecular weights up to 300,000 or higher, and are adaptable for use in lubricating oils. When added in small amounts (less than 1 per cent) to lube oils, the latter's viscosity and viscosity index are greatly improved. These long molecules from olefins are finding other uses as well, for example, when mixed with a filler to make it kneadable, a cleaning composition for wall paper rubber stamps, etc., results.

It is safe to predict that if a chemist is given an organic substance, he will sooner or later

nitrate it and chlorinate it. With the petroleum hydrocarbons this development has been somewhat sporadic. Of course, the nitration and chlorination of the aromatics are nothing short of traditional. It was well into the 1920's before any great advances had been made with chlorinating the aliphatics. Of these, the amyl chlorides are of particular importance. As for nitrating the aliphatics, particularly the gaseous members, not a single process of commercial value had been worked out prior to a few short years ago. At that time a vapor-phase nitration of propane, the butanes, etc., was developed which will likely prove one of the revolutionary developments in the field of aliphatic derivatives in recent years. The nitroparaffins, nitro-ethane, -butane, etc., are reported to be excellent solvents for cellulose derivatives and are said to be surprisingly nontoxic materials. Although at present their synthesis is in the process of adaptation to large scale production, their advent on the market will probably cast new light on many chemical operations.

Detergents

In the field of detergents and wetting agents during the past few years there has been a decided swing toward the so-called "soapless" detergents, namely, alkali salts of the sulfates of long-chain alcohols. Many of the tooth powder and shaving preparations have changed to this type of cleanser. The petroleum chemist, by reacting olefins with sulfuric acid at low temperatures, has succeeded in making organic sulfate esters analogous to those prepared by reacting sulfuric acid with long-chain aliphatic alcohols.

And again, in keeping with industrial economy, the petroleum refiner has felt the urge to pay another visit to the "junk heap," and again he has emerged with a new product. In the refining of petroleum distillates with sulfuric acid, a black tarry acid-sludge is obtained. From this anything but inviting sludge have been isolated certain organic sulfonates, the salts of which possess marked detergent properties. Although all the fields of application of these sulfonates and sulfates are too numerous to mention here (a few include insecticidal sprays, the coating of coal to prevent dusting, laundering, hair shampoos, lubricating greases, metal polish, pickling inhibitors, dry cleaning, etc.), it is felt that a particular interphenomenon existing between these detergents is worthy of mention. By adding a small amount of petroleum sulfonates to a saturated aqueous solution of the sodium-alcohol sulfates, the solubility of the latter is considerably increased, and further quantities can readily be dissolved. Thus, the petroleum sulfonate detergents have become known as latescent activators.

Anesthetics

Indeed it may be said that the worker in petroleum has left not a stone unturned, nor has he hesitated to make new stones. No field can safely be said to be out of reach of the petroleum chemist. One very active line of investigation at present is that of hydrocarbon anesthetics. Of course, the use of ethylene has been long known. Propene and acetylene have been used in certain experimental anethesias, but cyclopropane is the most recent, and perhaps the most promising, hydrocarbon yet used in anethesia. Having been advocated only a short time ago, the use of this cyclic hydrocarbon gas is spreading at a very rapid rate. It has a pleasant odor, is easy to breathe, and the after-effects of its use are practically nil. So important is this new branch of petroleum chemistry that the writer has added an additional chapter on the use of petroleum hydrocarbons in anesthesia to the 53 other chapters comprising the second edition of his comprehensive treatise on "The Chemistry of Petroleum Derivatives" (Reinhold Publishing Corp., New York, 1937). One of the principal advantages of cyclopropane in anesthesia is that patients under its influence are characterized by quiet breathing, a factor of vital importance in thoracic surgery.

The complex nitrogen bases of petroleum, believed to have resulted originally from the pyrolysis of proteins, have received some attention and research in the past, but only recently has any great light been shed on their exact chemical structures. Although much more work will probably have to be done on these materials before they become of any significant commercial value, it is believed that the nitrogen bases of petroleum represent one of the fertile fields of investigation for the petroleum chemists. Hail to the chemist who is possessed with the determination to master the nitrogen bases of petroleum.

Looking into the future, one would probably need the assistance of several crystal gazers in order to predict what a treatise on petroleum chemistry a decade hence would cover. Perhaps, if human comprehension could allow one to visualize the vast number of individual hydrocarbons present in a given crude, then one might conceive of the vastness of the possibilities of petroleum derivatives. Petroleum hydrocarbons range from gaseous methane to mineral waxes (20 to 40 carbon atoms) and tars. When one considers that hydrocarbons of 20 carbon atoms could be represented by 366,319 possible isomers (3,395,964 if stereo-isomers are included), only then can the undertaking be appreciated.

However, when fractionating columns and analytical procedures are sufficiently perfected to separate more individual hydrocarbons from petroleum, it stands to reason that the number of petroleum derivatives will be expanded accordingly. So, from the standpoint of the student of the future attempting to study petroleum chemistry, let us be thankful that we were not born too late.

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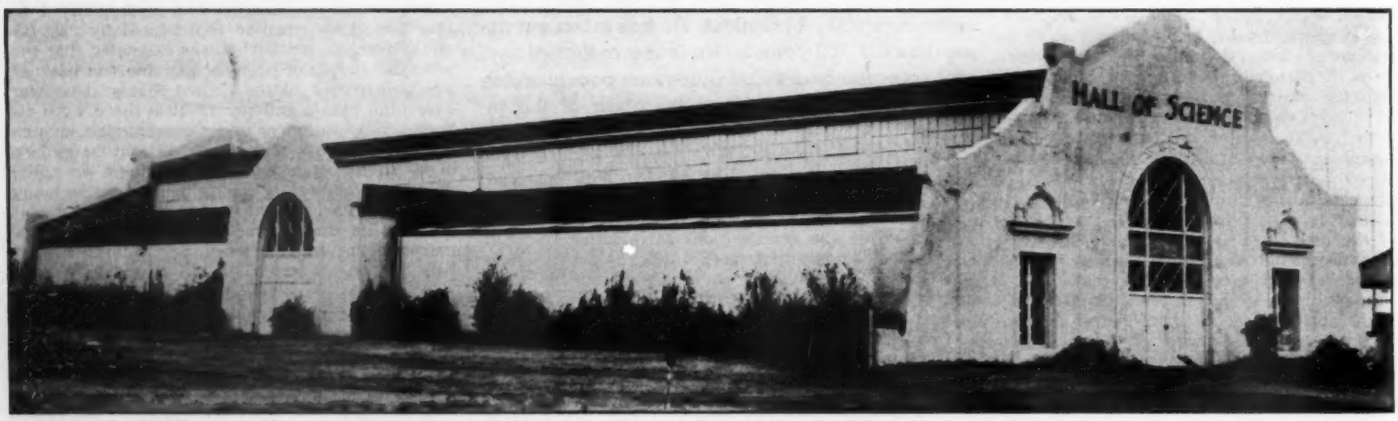
Scientific and technical exhibits at the International Exposition will be displayed in the Hall of Science



The $250,000 new building program of the International Petroleum Exposition was near completion this week, one month before opening of the big oil show in Tulsa May 14 to 21. Exhibitors have begun moving in their material, steel derricks are being erected, other large outdoor exhibits are being placed, and beautification of the grounds is under way, with indications everything will be ready several days prior to the opening date.

Two new exhibit buildings were completed the past week. One is the 60 by 420-foot annex to the Oklahoma Building, exactly doubling the size of that structure. The annex will provide an additional 131 booths for exhibitors.

The Kansas Building, the other new structure just completed, is 60 feet wide by 220 feet long and provides 84 booths for exhibitors. The Oklahoma and Kansas buildings are on the south side of the grounds.

Remodeling of the old Scientific and Technical Building, in the middle of the grounds, has been completed and exhibitors are moving in. Heretofore, about half of this building was occupied by commercial exhibitors and the remainder was given over to free scientific exhibits and an auditorium. The free space and auditorium have been eliminated, providing an additional 41 booths for exhibits.

The Hall of Science is 60 feet wide by 280 feet long, and is at the northwest corner of the grounds, adjacent to one of the main entrances. It will house the scientific and technical exhibit which was loaned to the exposition by the Chicago Museum of Science and Industry, as well as numerous other displays. Here, it is said, will be assembled the largest and most complete exhibit of scientific and technical material ever seen at an oil show. Installation of the Chicago exhibits is due for completion by the end of this week and all scientific material is scheduled to be in place by May 1. Guides from the University of Tulsa engineering school will be on duty in this building during the exposition to explain details of the scientific displays to visitors.

The new cafeteria and the new office building also have been completed. The cafeteria building is 60 feet wide by 90 feet long, providing accommodations for between 600 and 750 diners at one time, about double the capacity of the old cafeteria. The new building is at the extreme east end of the grounds, separated from exhibit buildings by a wide driveway and surrounded by gardens and an abundance of parking space. The old cafeteria, at the southwest corner of the grounds, was demolished and the space will be occupied by outside exhibits.

A two-story, brick office building erected at the northwest corner of the grounds provides twice the office space of the old. The exposition offices, located at 220 East Third Street, in Tulsa, while construction has been under way, have been moved to the grounds.

In addition to the building program, nine commercial exhibitors are erecting permanent structures. This will make a total of 28 privately owned exhibit buildings. Modernistic fronts are being erected at the entrances to the Texas, Oklahoma, and Scientific and Technical buildings, in keeping with the general beautification program. That work is to be completed this week.

There will be four main entrances to the grounds this year, instead of two. These will be at the four corners of the grounds, with private entrances for exhibitors at convenient intervals between.

Outside exhibit space at the 1938 exposition will be 42 per cent greater than at the 1936 show. More parking space also will be available, due to enlargement of the grounds and the opening of additional entrances.

Crowding the Wells on Centralia Lots

The Centralia field, which was opened less than 2 miles west and north of the city of Centralia, Ill., by the Adams Oil & Gas Co. was not long in spreading over eastward into the city itself, beginning with wells on lots in real estate extension areas and steadily working into the city.

Centralia lies mostly in Township 1n-1e, in Marion County. It is the center of a coal region and depended on this and on agriculture, and varied manufacturing lines, for its upkeep. This condition was true of Centralia until less than three months ago. Now it is one of the liveliest oil centers in the United States, with a floating population that taxes the city's capacity to take care of it.

Because of its location not many miles south of the Patoka pool, opened in January last year, and the fact that it is only 62 miles east of St. Louis, Mo., Centralia was picked as the stopping place for the first influx of oil men attracted to Marion County by the discovery of oil. The city is on the Chicago, Burlington & Quincy Railroad, the Southern Railway System, the Illinois Central and the Missouri-Illinois Railroad making it an easy town to reach.

It enjoyed a boom for a short time and then most of the oil companies established headquarters in Mattoon, while scattered companies chose Effingham, Olney and Robinson for their permanent offices, leaving Centralia with only two seismograph crews and a few individual oil operators. It was not until this year that the city came into its own as an oil center, and unlike Mattoon and Effingham it has been proven to lie over a rich oil field.

The Centralia field was opened in December, 1937, by Adams Oil & Gas Co. No. 1 on the Schmitz farm, SE SE NE section 2-1n-1w. It was a 90-bbl. well from Benoist sand at 1,347-84 feet. Shell Petroleum Corp., offsetting Adams on the west, completed the second well in the new pool, No. 1 Criley, SW SE NE section 2, and got a 150-bbl. well in Benoist sand. Adams Oil & Gas Co. at the same time was getting ready to start No. 2 but Max Conry and Taylor Noll made a location for No. 1 Barth, NW SE SW section 12, about a mile and a half south and east of the discovery, and about a half mile west of the city limits of Centralia, and Taylor Brothers went over the city line and started a well on the Hefter heirs property in SE SE section 13-1n-1w. Shell's second well on the Criley farm was better than the first, starting at 196 bbls. While all this was going on over the period of six weeks a leasing boom was in progress and new operators bobbed up almost daily, leasing inside and outside the city limits.

About the middle of February Adams Oil & Gas Co. completed the first of the larger producers in the pool, No. 1 Hefter Heirs in the SW NE section 13-1n-1w, but just outside the city limits. It pumped 1,469 bbls. in five days, with a top of 342 bbls. on the second day. At about the same time Roark & Moore, Pugh Drilling Co., I. T. Evans, and A. B. Ryan were starting wells inside the city limits. The following week Paul Henshaw and J. P. Whishant proved that the pool had a northwest-southeast trend by completing a failure in the NW SW SW section 13-1n-1w, having uncovered salt water in Benoist sand at 1,435-43 feet. At the same time Conry & Noll's Barth test in section 12 proved good for 130 bbls.

Locations and drilling wells inside the city limits began to increase rapidly. D. Fox, Ray Brown, Adams Oil & Gas Co., Rourke & Morse, J. D. Reynolds, John Pugh, Luke & Schneider, H. & H. Oil Co., Lilly and others, Selegna Petroleum Corp., Nash & Redwine, Muhlbach & Pray, T. T. Eason, B. M. Hastings, and others were getting in on the town-lot play and starting active operations. John Pugh got a 280-bbl. well in his No. 1 Copple in the NE NE section 13 inside the city.

Twenty operations were started in the field in one week in mid-March, both outside and inside the city. John Pugh No. 1 Phoenix, NW cor. SE NE section 13, was the best well yet drilled, starting at 492 bbls. a day. It was a town-lot well and near it Pugh completed a 330-bbl. well, No. 1 Williams, the same week. Two other wells close

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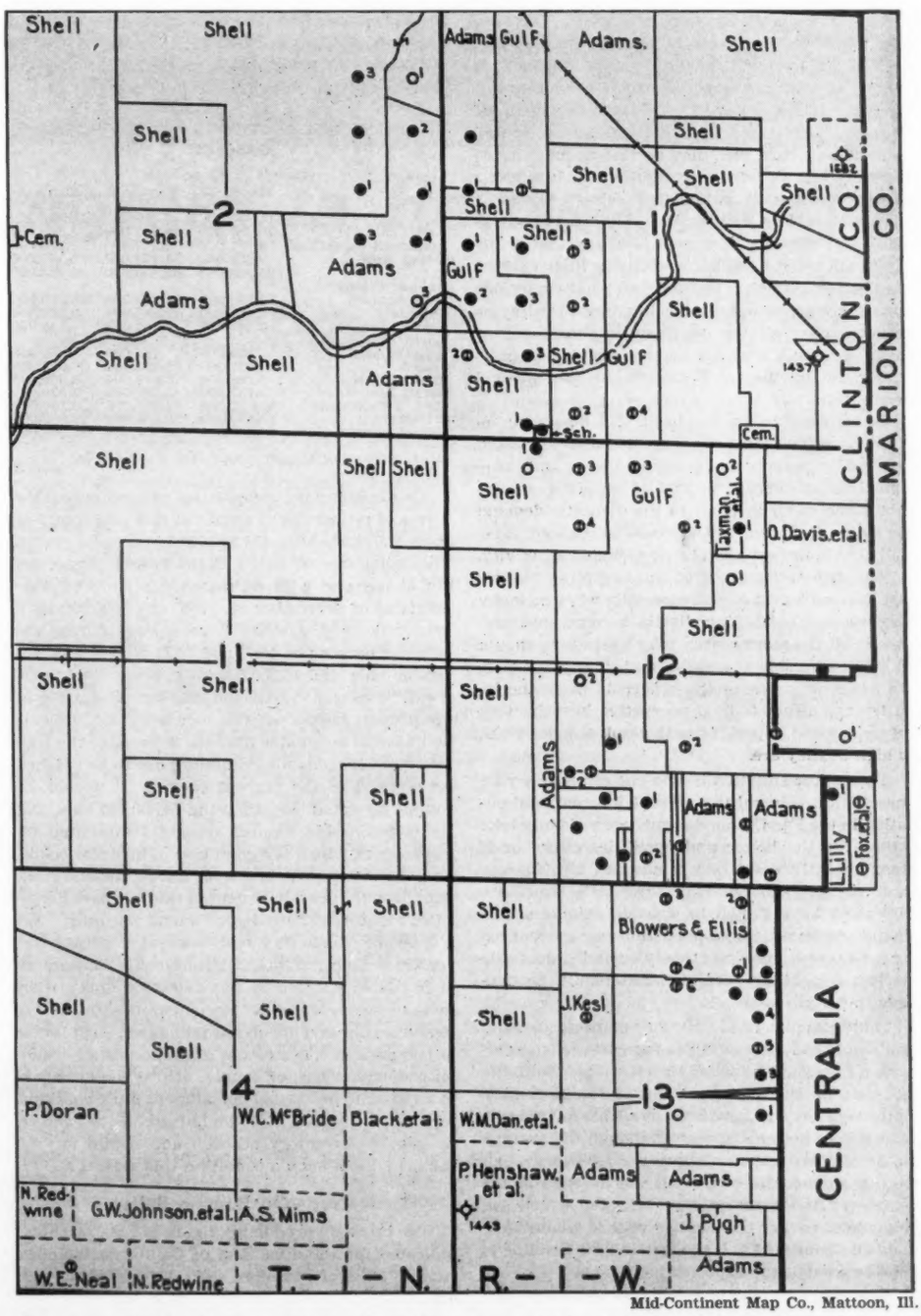


Mid-Continent Map Co., Mattoon, Ill.

The west side of the new Centralia field, lying outside the city of Centralia. The field was opened by Adams Oil & Gas Co. No. 1, SE SE NE section 2-1n-1w

Gasoline Stocks Should Be Cut to the Level of Last Year

By FRED VAN COVERN
Manager, A.P.I. Statistical Department*

Total automobile registrations during 1937, including passenger cars, trucks, and busses, amounted to about 30,000,000. New car registrations during the year were 4,100,000, but 3,000,000 units probably were scrapped. The average number of vehicles in use during the year totaled 26,400,000. How many new units will be registered during 1938 is difficult to foretell at this time, but this does have a very direct bearing upon demand. Our own figures indicate that the retail sales of new cars, etc., may decline as much as 35 per cent, but we have seen figures which reflect a greater decline in anticipated sales. Assuming that new vehicle registrations will total about 2,700,000 or almost 35 per cent less, and that scrappings will reach 2,150,000, a relatively higher figure than in 1937, which is the usual effect of conditions such as we are now experiencing, first-time buyers of new cars declining relatively in times such as these, we find a probable average number of units in use during 1938 of 27,200,000, or just about 3 per cent more.

So, if we start on the basis of a 3-per-cent increase in vehicles in use, we must assume that each unit will consume as much in 1938 as each consumed on an average in 1937 if we are to realize that much of an increase in the domestic demand for motor fuel; but this may not be realized, especially in view of expected levels of business activity.

The difficulties involved in attempting to forecast demand a year ahead, especially when so many uncertainties exist, immediately become apparent. This is all the more reason why operations should be kept as flexible as possible and closely watched. We are now in one of those periods when the industry can afford to be conservative in estimating future demand, especially with gasoline inventories as high as they are.

The export situation is also one of considerable uncertainty. Should the present international situation in the Far East and elsewhere suddenly take a turn for the better and hostilities cease, or if other recently developed tendencies abroad continue, our foreign shipments may be affected. These shipments have grown to sizeable amounts, and, should any considerable portion of our current exports be forced upon an already curtailed domestic market, serious dislocation might result, particularly in certain areas.

Taking January and February domestic demand as a whole and attempting to interpret what information is now available for March, coupled with the fact that, on the average, about one million more motor vehicles will have been available for use this year, it does not now appear as though the average motor vehicle of the first quarter of 1938 very much more than held its own with the average motor vehicle of the first quarter of 1937, which we pointed out earlier the average vehicle would have to do all through 1938 if the demand for gasoline is to be as great as the expected increase of 3 per cent in the average number of vehicles in use.

*From "A Discussion of the Economics of the Inventory Situation."

Exports of motor fuel during January continued high as did those of February, when nearly 4,000,000 bbls. were shipped abroad. This is the largest movement of its kind in any one month in several years, with the exception of September, 1937. It is possible, however, that March exports may establish lower levels, thereby reflecting the unusually large shipments in February.

INVENTORIES OF FINISHED AND UNFINISHED GASOLINE

(Barrels of 42 gallons)

	March 31 1936 (USBM*)	March 31 1937 (USBM)	March 31 1938 (Estimated)
East Coast	20,467,000	18,757,000	23,510,000
Louisiana Gulf Coast	1,991,000	1,967,000	3,130,000
Texas Gulf	9,501,000	11,771,000	15,140,000
	31,959,000	32,495,000	41,780,000
Indiana-Illinois-Kentucky	12,115,000	14,871,000	16,310,000
Oklahoma-Kansas	8,456,000	9,943,000	8,250,000
North Texas	2,387,000	2,905,000	2,730,000
North Louisiana-Arkansas	699,000	734,000	690,000
	23,657,000	28,453,000	27,980,000
Appalachian	3,258,000	3,114,000	3,820,000
Rocky Mountain	1,737,000	2,181,000	2,520,000
East of California	60,611,000	60,243,000	76,100,000
California	13,874,000	15,408,000	16,800,000
United States	74,485,000	81,651,000	92,900,000

*U. S. Bureau of Mines.

Our calculations indicate that minimum requirements of refiners as of April 1 of this year total less than 80,000,000 bbls. (78,500,000 bbls., to be exact). This compares with the 93,000,000-bbl. figure set out above, and with estimated minimum requirements as of September 30, 1938, of 62,000,000 bbls. Withdrawals of gasoline from storage during the summer seasons of 1936 and 1937 were about 16,700,000 bbls. and 16,300,000 bbls., respectively. So it will be seen that, with the 1938 season starting at the present high level, this summer's withdrawals will have to be greater than the average of the past two years if economic minimums are to be reached by the end of the current season. It should, of course, be stated here than the 78,500,000 bbls. and the 62,000,000-bbl. figures represent minimum requirements, which is a condition of inventories difficult of attainment in that it means that no company would have a barrel more than its bare necessities call for. The industry would naturally find a measure of stability with somewhat greater inventories than minimum requirements indicate as of the dates referred to, but 93,000,000 bbls. actual inventories on March 31 as compared with 78,500,000-bbl. requirements do not fall within such limits of comparison. The recent effort to curtail crude-oil production has, of course, helped the situation to an extent; but actual curtailment must continue well beyond March 31 if the industry is to balance its gasoline-inventory position and obtain any of the benefits of such a condition this season.

Crude-Oil Runs to Stills

The crude-oil production figure of 2,600,000 bbls. indicated for the area East of California includes runs to stills of not more than 2,500,000 bbls. per day.

Of course, economic operation will in some cases make it necessary to increase runs, which only means that in other cases excesses will have to be cut in greater proportion than the figures seem to indicate on the average, and it is also very evident that the industry as a whole will have to forego the usual spring step-up in both runs to stills and crude-oil production.

It goes without saying that the reaction of refiners in the present situation, particularly those with crude-oil inventories, will in a large measure mean the success or failure of whatever effort is made by the state regulatory bodies and crude-oil producers. Has the refiner been cooperating with the producer? A comparison of recent trends of operation in the two branches would seem to indicate that while both have made some progress, neither has yet settled down to the task before it if economically desirable levels are to be attained by July 1.

A comparison of the trends of the two branches, by weeks since January 15, follows:

EAST OF CALIFORNIA*

(Barrels of 42 gallons)

	Crude-oil production		Crude-oil runs to stills	
Week ended—	Daily average	Change since Jan. 15	Daily average	Change since Jan. 15
January 15	2,764,000		2,664,000	
22	2,789,000	+ 25,000	2,629,000	— 35,000
29	2,632,000	—132,000	2,619,000	— 45,000
February 5	2,587,000	—177,000	2,620,000	— 44,000
12	2,588,000	—176,000	2,618,000	— 46,000
19	2,629,000	—135,000	2,623,000	— 41,000
26	2,578,000	—186,000	2,607,000	— 57,000
March 5	2,619,000	—145,000	2,543,000	—121,000
12	2,654,000	—110,000	2,561,000	—103,000
19	2,680,000	— 84,000	2,535,000	—129,000
26	2,681,000	— 83,000	2,572,000	— 92,000
April 2	2,663,000	—101,000	2,609,000	— 55,000

*A.P.I. figures.

The surplus of gasoline now existing is not entirely of recent origin. True, much has been added to storage in recent weeks, but we entered the winter season with too much gasoline just as we did in the fall of 1936. One of the reasons for the somewhat larger than required inventories of last fall was, no doubt, due to the falling off in demand, which we think first indicated itself in July of last year, and which has continued to lower relative levels ever since. The failure of the industry more quickly to realize that demand for gasoline and other products was not progressing at expected rates and to curtail accordingly was, of course, a large factor in building up these inventories.

Crude-oil production throughout the entire summer of 1937 and well into the fall and winter, even in spite of the unnecessarily high rate of runs to stills, resulted in large additions to storage. The net overproduction of crude oil during last year was approximately 47,000,000 bbls., or 130,000 bbls. per day. This calculation is based on the conversion to crude oil equivalent of the 14,000,000-bbl. increase in gasoline inventories during the year which on January 1, 1937, amounted to about 63,000,000 bbls., and on December 31 almost 77,000,000 bbls., plus the daily-average additions to crude-oil inventories which resulted from increasing these stocks from 288,000,000 bbls. on January 1 to 306,-

(Continued on Page 70)

WASHINGTON

By Henry D. Ralph

Action of Congress Is Reassuring to Business

WASHINGTON, Apr., 11.—The action of the house in defeating the government reorganization bill in what was virtually a vote of lack of confidence in President Roosevelt makes it certain little legislation disturbing to business will be enacted during the remainder of this session of congress.

The vote is viewed as definite proof members of congress are convinced the country will not tolerate further concentration of power in the executive nor further innovations in government at the present time. It is interpreted as spelling the doom of the attempt to revive the wage and hour control bill and as making it very unlikely congress will pass the president's bill to create regional natural resource planning bodies. Coming on top of the senate action in eliminating from the pending tax bill all vestiges of the administration's undistributed corporation profits tax, the vote on reorganization suggests that house conferees on the tax bill will not be able to gain support for resisting the senate action.

Revolt of Congress

The action of the house was remarkable for several reasons. In the first place, the house last year passed with only 75 dissenting votes a bill containing the essential features of the measure just defeated, so recommittal by 204 to 196 clearly shows the vote hinged far more on the question of lack of confidence in President Roosevelt than on the merits of the legislation itself. In the second place, the bill was violently opposed by spokesmen for business interests although as a matter of fact it would have very little bearing on business conditions or the relations between business and government. The bill dealt solely with administrative functioning and the machinery of government and in its final form gave the president no authority to interfere with the operations of independent and quasijudicial agencies enforcing laws affecting business. The objectives of the bill, more efficient government and a reduction in bureaucracy, have long been sought by business and by both political parties.

Because of these facts, the action of the house is taken as a revolt of congress against President Roosevelt's leadership and a sign that a large number of Democratic representatives, all of whom must stand for reelection this year, have decided it is now politically safe to cut loose from the president's apron strings. Administration spokesmen used all sorts of pressure and inducements to secure enactment of the measure and just before the final vote house leaders took the floor to insist that a vote to recommit the bill was a vote of lack of confidence in the president.

Recovery Program

Even before the vote on the reorganization bill, a number of high administration officials had been attempting to convince President Roosevelt that to a very considerable extent the present business recession is due to a lack of confidence in the administration and that the most constructive thing the president could do would be to refrain from suggesting any further reforms or making any drastic new moves to regulate business.

But other groups of officials have been importuning him to resume a program of pump priming and heavy spending, and these groups have apparently prevailed upon the president to make another attempt at stimulating business through the outflow of government funds. A plan is being discussed within the administration for new legislation authorizing $1,500,000,000 for public works. Instead of a direct appropriation to be financed by regular Treasury borrowings, a new agency may be created to sell bonds fully guaranteed by the government in the same way that the Home Owners Loan Corporation and many other new deal agencies are financed. This would prevent the obligations from showing up as a deficit in the Treasury, although of course they would add to the public debt. From the funds so raised money would be loaned to states and municipalities without interest, to be repaid at the rate of 2 per cent per year for 50 years. This would be roughly equivalent to the old PWA program under which municipalities were given grants of 45 per cent in addition to interest-bearing loans, but could be made to look more like a loan than a gift.

Such a spending program would be designed to boost the construction and other heavy industries and would be in addition to the relief program for which at least another $1,500,000,000 probably will be asked for the coming fiscal year. President Roosevelt has just signed legislation authorizing the Reconstruction Finance Corporation to use up the $1,500,000,000 to be supplied by the Treasury for making loans to smaller business enterprises, so that a total of $4,500,000,000 of government money may be pumped out into industry during the coming year.

Gillette Bill

A further hearing on the Gillette bill to divorce the marketing of petroleum products from other branches of the industry brought forth additional testimony in favor of the measure and a warning from Senator Pat McCarran of Nevada, who is conducting the hearings, that opponents of the legislation must appear promptly if they wish to testify. A third hearing has been scheduled for April 20 before the subcommittee of the senate judiciary committee.

C. O. Beroth, Chicago, representing Acme Petroleum Co., and the Illinois Petroleum Marketers Association, told the subcommittee independent jobbers are being forced out of business because they cannot compete with the marketing operations of major integrated companies. He said the majors are able to market their products at a loss, and cover this loss with profits from other departments. He believed jobbers in his area could work out a plan whereby they could operate at a profit, and passage of the Gillette bill is a necessary step in such a program. His plan is a cooperative movement of jobbers to obtain a crude supply by barge from Louisiana or Michigan fields, and build a refinery in the Chicago area.

Russell Williams, Indianapolis, representing the Indiana Independent Petroleum Association, declared pipe lines should be separated from the major companies and made common carriers.

The recent freight rate increase of 10 per cent will give the major companies an additional advantage, according to Roy L. Brecke, Wisconsin Petroleum Association, of Milwaukee, Wis. He said many jobbers are forced to use the railroads, because they ship in small quantities, while the major companies can use their pipe lines in many localities.

Continental's Deepest Test Rated 2,150 Bbls. at 13,000 Feet

LOS ANGELES, Calif., Apr. 12.—Continental Oil Co. No. 2 Kern County Land, wildcat in Wasco, California, the deepest well in the world, has been completed flowing 2,150 bbls. of 34-gravity oil and 1,000,000 feet of gas. The well is at present flowing 121 bbls. per hour. A string of 4½-inch liner is carrying perforations at 13,092 to 13,173 feet and 14,049 to 14,315 feet. The production is believed coming from 13,000-foot level.

The well, originally drilled to 15,010 feet at an estimated cost of $300,000, was plugged back to 13,600 feet.

Drilling was started in June 1937, and on January 31 it passed the depth of 12,786 feet, the former world's record established in Upton County, Texas, in 1935 in a well that failed to produce and was abandoned.

Difficulty with heat, estimated at upwards of 225° F., was encountered, and on April 4 efforts to drill deeper were abandoned and the crew started making tests at upper levels.

The Wasco well becomes the deepest producer in the world. Union Oil Co. brought in a producer near Shafter, about 10 miles south of the Continental well, last November. It came into production at 11,302 feet at the rate of 2,400 bbls. per day of 39.6-gravity oil.

The only other well producing from below 11,000 feet is Humble Oil & Refining Co. No. 1 Ellender in the Houma field of the Louisiana Gulf Coast, completed May 10, 1937.

Pennsylvania Oil Investigation Declared Illegal by Court

HARRISBURG, Pa. — The legislative investigation of the oil and gasoline industry of Pennsylvania authorized by the 1937 legislature upon request of Governor Earle has been declared illegal by the Dauphin County Court.

In an opinion by Judge John E. Fox the investigation was held unconstitutional because it was created by a joint resolution in the legislature instead of a regular act, and thus improperly set up. It was held, too, that the powers of the commission were too broad.

"We find no limitations or restrictions on the investigation," the opinion read, "the commission itself is permitted to be the judge of the investigation it shall make. The commission is to determine whether legislation is needed to fix rates and to report to the governor with no direction that he is to make report to the legislature.

"We are of the opinion that the determination, whether or not, legislation is needed is a legislative action and likewise the fixing of rates, and the legislature cannot delegate such determination to a commission.

"The resolution is defective in that it requires no report to be made to the legislature nor is there any designated time when the report shall be made. Its compulsory powers are too broad."

Judge Fox declared that "the business of lubricating oil and gasoline are not affected with public interest; no appropriation of the public funds can be made by joint resolution."

Petroleum Fluid Metering Conference at Norman

More than 150 men from the oil industry and about 125 student engineers attended the conference on fluid metering held at Norman, Okla., April 7-8, under the auspices of the petroleum division of the American Society of Mechanical Engineers and the College of Engineering, University of Oklahoma. Dean W. H. Carson, of the engineering college, had charge. Department heads from 12 states were present, some coming from Philadelphia and Pittsburgh, Pa., Findlay, Ohio; California, Texas, Oklahoma, and Kansas.

As this technical session dealt with the development of meters for measurement of oil as produced from the wells and as handled in the pipe lines it is of considerable importance to the industry because it has long been recognized that if gauging could be done by mechanical means many advantages would accrue.

Reports of progress were made by several manufacturers, some of whom are working closely with petroleum and production engineers, combining theoretical and practical experience to the end that oil meters may be available for general use that will have been proved practical in field service.

At a general meeting on the night of April 8 the papers presented at the technical meetings were reviewed and general discussion followed. It is planned to publish all papers and discussions as soon as manuscripts are available and copies can be secured from W. H. Carson, College of Engineering, University of Oklahoma, Norman, Okla., for $1.50 each.

The Bureau of Mines has announced the results of oil meter-calibration tests are soon to be published as a report of investigations entitled "Calibration of Positive-Displacement-Oil Meters," by R. E. Heithecker and W. B. Berwald in cooperation with the state of Oklahoma. When issued the report can be obtained from the Bureau of Mines, Washington, D. C.

New Gasoline Products President Announces Research Program

An enlargement of the current program of research of Gasoline Products Co., Inc., and its other activities has been announced by W. H. Sullivan, newly elected president. Mr. Sullivan, formerly vice president and treasurer, succeeds William F. Moore, who resigned February 15 after several years as president to accept an executive position with the Texas Co.

Mr. Sullivan, discussing the value of research and the business prospects of Gasoline Products Co., outlined the history of the company from the licensing of the first commercial unit prior to 1921, and referred to the evolution of the small Cross unit into the large combination units of today. This evolution, he said, was made possible by early acquisition by Gasoline Products of licensing rights for the Holmes-Manley, Tube and Tank, and other processes, from which modern combination units have been developed. He pointed out that Gasoline Products Co. has pioneered numerous advances in cracking, including the multi-function operations represented in both large and small combination units, as well as numerous individual developments. This has been the result of the constant pursuit of research in the laboratory and on a commercial scale, to meet changing yield and quality requirements. New requirements are arising and Gasoline Products has doubled its research program to anticipate them. Research is being focused particularly on possibilities of increasing octane number of gasoline and yield of satisfactory distillate fuels beyond present levels.

Mr. Sullivan is hopeful new developments for the benefit of licensees will result from the increased research program, which is carried on in the laboratories of its licensing agent, M. W. Kellogg Co. No reduction of activities in connection with licensing of present processes, is however, contemplated.

Pike H. Sullivan, recently elected vice president of Gasoline Products Co., was formerly secretary and patent attorney of the company. E. F. Liebrecht was elected secretary and will function as general patent attorney.

W. H. Sullivan started in the oil business with the Texas Co. in 1920. After 10 years' service he resigned in 1930 to accept the position of secretary and treasurer of Gasoline Products Co. Mr. Sullivan was also recently elected president of Process Management Co

W. H. SULLIVAN

Canadian Gasoline Prices And Increased Taxes

OTTAWA, Ontario. — Gasoline tax increases have made little difference so far in retail prices throughout Canada. For standard grades the price ranges from 23½ cents at Montreal to between 28 and 33 cents in Prince Edward Island, where the tax is now 10 cents. Nova Scotia and New Brunswick have increased the tax this year from 8 to 10 cents, but the retail price of standard grades in Halifax and St. John moved up only one-half cent. Standard grades in Ontario, where the tax is 6 cents, range from 24½ to 26 cents. The Quebec tax is 6 cents.

All four western provinces have a 7-cent tax, bringing prices to: Manitoba, 30 cents; Saskatchewan, 31 cents; Alberta, 27 to 29½ cents; British Columbia, 27 cents. Since December prices in Alberta have dropped 1 to 2 cents and in Saskatchewan 1½ cents.

Oil Industry Is Fostering Vocational Training Program

To assist the school districts in the various oil-producing centers in presenting study courses on subjects of particular interest to oil field workers, a topical committee on vocational training has been appointed by the American Petroleum Institute, Pacific Coast District, Division of Production, according to an announcement by Chairman L. L. Aubert of the Bankline Oil Co.

North Texas Geological Meeting at Wichita Falls

FORT WORTH, Tex.—The North Texas Geological Society will meet for a dinner Thursday evening, April 14, at the Wichita Club, Wichita Falls, Tex.

Dr. Hal P. Bybee, head of the department of geology, University of Texas, and chief geologist for the University of Texas Board of Lands, will deliver a paper on "Limestone Reservoirs." Borto R. Haigh of Midland, geologist with the University of Texas Board of Lands, will discuss "The History of University Lands."

Shell Petroleum Reduces New Mexico Purchases

A 20 per cent reduction in purchases and receipts of crude oil in New Mexico, effective April 10, was announced by Shell Petroleum Corp. The company will take only 80 per cent of the current month's daily allowable of the wells from which it is purchasing or hereafter agrees to purchase crude oil, New Mexico producers were notified.

the OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

Published weekly by The Petroleum Publishing Company at Tulsa, Oklahoma

Combating Slander

A large part of the unfortunate publicity directed against the oil industry during the past year has originated with those who profess to represent the marketing division, seeking to embarrass the entire industry.

The industry, to a large extent, gave up its direct control in both the wholesale and retail branches when it adopted the dealer plan of marketing. It now finds itself in the position of still having a large part of its investment in the wholesale and retail fields without any direct authority over their operations.

This was the natural result of chain store legislation, discriminatory labor regulations and impossible social legislation.

Realizing the weakness inherent in the situation there have been those who sought to organize individual dealers and jobbers, declaring these marketing units are not getting a square deal from their sources of supply. Representatives of these organizations have appeared in Washington and at the state capitals endeavoring to secure legislation aimed against the producing, transportation and refining branches.

Actually what these people are attempting to do is to return the industry to a state of chaos, thinking they would be in better position to reap speculative profits.

Any fair analysis of these claims would show quickly that this would be ruinous not only to the bulk of the industry but injurious to the interests of the consumers and in the long run equally burdensome to legitimate marketers.

These agitators represent actually only an insignificant fraction of the tens of thousands of jobbers and retailers in this country. There is every reason to believe the great majority of the dealers realize they are well treated by their refinery sources of supply and have no disposition at all to bring confusion to those who have the responsibility of finding, transporting and manufacturing the finished petroleum product. As usual, in the case of those satisfied with conditions, this majority at present have no one to represent them effectively when occasion requires.

The remedy is obvious. The industry through its satisfied marketing representatives must place itself in a position to combat those who seek to embarrass it. It must present the facts to legislative and other investigating committees. Where these committees are dominated by political bias it must be prepared to go a step farther and present its case directly to consumers.

The industry has nothing to fear from these investigations. It has not maintained a selfish attitude toward its marketing affiliates. Quite the contrary. Right now over a large part of the United States the jobbers and dealers retain to themselves a larger part of a gasoline sale than does the refiner. The 3½ cents or more allowed the retail dealer means in effect that he obtains more for turning the crank of a filling station pump than does the operator for finding, drilling and producing the crude from which the gasoline is obtained.

The legitimate dealers recognize that their betterment depends upon closer cooperation with their suppliers and not in bringing about conditions which will invite federal control, eventually forcing the marketing branch into the status of a public utility.

The marketing end is the point where the industry comes into direct contact with its customers. The companies who have this tremendous investment in merchandising their products and the dealers who represent the oil industry to the public have a common interest in combating falsehoods about the oil business.

Those who slander the industry for their own ends should not be allowed to get away with it.

First 2 Months Demand for Gasoline Has Gain

The production of crude petroleum declined for the sixth successive month in February, when the daily average was 3,380,800 bbls., compared with 3,419,600 bbls. in January and 3,327,600 bbls. in February, 1937. Probably the most notable record of the month was the attainment of the new peak for production in the Louisiana Gulf Coast. The daily average output for every state east of the Mississippi increased, even though prices were weaker.

Refinable crude-oil stocks increased about 150,000 bbls. in February, compared with a gain of about 1,100,000 bbls. in January. This change in the trend of stocks is related to the fact that in February production declined more than runs to stills.

The domestic demand for motor fuel in February was 31,861,000 bbls., or slightly below the comparable figure of a year ago. On the other hand, exports exceeded expectations, totaling 3,931,000 bbls., compared with 2,640,000 bbls. for February, 1937. The increase in gasoline stocks showed signs of slackening in February, "only" 6,407,000 bbls. being added to finished and unfinished stocks during the month. The weekly reports for March indicate a further addition of nearly 2,000,000 bbls. in that month, to a total of about 94,000,000 bbls. for March 31.

The consumption of kerosene and fuel oil as a group rallied from the disappointing showing of January, but the daily average was below that of a year ago.

United States Supply and Demand—Crude Oil (Bbls.)
January-February, 1938 and 1937

First 2 months—	Total supply	Total demand	Excess Demand	Excess Pct.	Domestic production	Imports	Indicated domestic demand‡	Exports	Stocks refinable crude Feb. 28
1938	204,647,000	204,382,000	*265,000	*.08	200,669,000	3,978,000	193,101,000	11,281,000	306,349,000
Daily average	3,468,000	3,464,000	5,000	....	3,401,000	67,000	3,273,000	191,000	.....
1937	193,472,000	192,079,000	*1,393,000	*.7	191,740,000	1,732,000	184,706,000	7,373,000	289,972,000
Daily average	3,279,000	3,256,000	24,000	....	3,250,000	29,000	3,131,000	125,000	.....
Increase, 1938	11,175,000	12,303,000	.....	....	8,929,000	2,246,000	8,395,000	3,908,000	16,377,000
	5.8%	6.4%	.....	....	4.6%	130%	4.6%	53.0%	5.6%

Supply and Demand—Refinery Products—Motor Fuels (Bbls.)

First 2 months—	Total supply	Total demand	Excess Demand	Excess Pct.	Domestic production	Imports	Domestic demand	Exports	Stocks Feb. 28§
1938	89,443,000	74,058,000	*15,385,000	*17.2	89,443,000	.....	67,037,000	7,921,000	97,297,000
Daily average	1,516,000	1,255,000	261,000	....	1,516,000	.....	1,136,000	119,000	.....
1937	86,739,000	71,314,000	*15,425,000	*17.7	86,739,000	.....	65,696,000	5,618,000	82,703,000
Daily average	1,470,000	1,209,000	261,000	....	1,470,000	.....	1,115,000	95,000	.....
Increase, 1938	2,704,000	2,744,000	.....	....	2,704,000	.....	1,341,000	1,403,000	14,594,000
	3.1%	3.9%	.....	....	3.1%	.....	2.1%	25.0%	17.7%
Kerosene									
1938	10,805,000	11,902,000	1,097,000	9.2	10,805,000	.....	10,377,000	1,575,000	5,986,000
1937	10,789,000	10,979,000	190,000	1.8	10,789,000	.....	9,523,000	1,456,000	5,443,000
Increase, 1938	16,000	923,000	.....	...	16,000	.....	854,000	69,000	543,000
	0.2%	8.4%	.....	....	0.2%	.....	8.4%	4.7%	10.0%
Gas Oil, Distillate Fuels and Residual Fuel Oil¶									
1938	81,517,000	79,952,000	*1,665,000	*1.9	78,605,000	2,912,000	73,764,000	6,188,000	105,638,000
1937	78,449,000	86,685,000	8,236,000	10.5	75,105,000	3,344,000	80,890,000	5,795,000	98,782,000
Increase, 1938	3,068,000	†6,833,000	.....	....	3,500,000	†432,000	†7,126,000	393,000	6,856,000
	3.9%	†7.8%	.....	....	4.6%	†12.9%	†8.8%	6.7%	8.9%
Gas Oil and Distillate Fuels									
1938	26,020,000	28,701,000	2,681,000	1.0	26,020,000	.....	24,293,000	4,408,000	19,885,000
1937	24,599,000	29,107,000	4,508,000	18	24,525,000	74,000	25,428,000	3,679,000	• 18,211,000
Increase, 1938	1,421,000	†406,000	.....	....	1,495,000	.....	†1,135,000	729,000	1,674,000
	5.8%	†1.5%	.....	....	6.1%	.....	†4.5%	19.8%	9.2%
Residual Fuel Oils									
1938	55,497,000	51,251,000	*4,246,000	*7.6	52,585,000	2,912,000	49,471,000	1,780,000	85,753,000
1937	53,850,000	57,578,000	3,728,000	6.9	50,580,000	3,270,000	55,462,000	2,116,000	80,571,000
Increase, 1938	1,647,000	†6,327,000	.....	....	2,005,000	†358,000	†5,991,000	†336,000	5,182,000
	3.1%	†10.9%	.....	....	3.9%	†10.9%	†10.9%	†16%	6.5%
Lubricating Oils									
1938	5,253,000	4,402,000	*851,000	*16.2	5,253,000	.....	2,782,000	1,620,000	8,363,000
1937	5,377,000	4,744,000	*733,000	*13.4	5,377,000	.....	3,169,000	1,575,000	7,115,000
Increase, 1938	†124,000	†342,000	.....	....	†124,000	.....	†387,000	45,000	1,248,000
	†2.3%	†7.2%	.....	....	†2.3%	.....	†12.2%	3%	17.5%
Petroleum Wax (Lbs.)									
1938	81,474,000	77,643,000	*3,831,000	*4.7	76,440,000	5,034,000	55,278,000	22,365,000	148,823,000
1937	87,770,000	89,392,000	1,622,000	1.9	83,440,000	4,330,000	48,221,000	41,171,000	109,012,000
Increase, 1938	†6,296,000	†11,749,000	.....	....	†7,000,000	704,000	7,057,000	†18,806,000	39,811,000
	†7.2%	†13.1%	.....	....	†8.3%	16.3%	14.6%	†45.6%	36.5%

*Excess supply. †Decrease. ‡Crude oil only. §Includes finished and unfinished refinery gasoline and natural gasolines. ¶Gas oil and fuel oil equals gas oil and distillate fuels plus residual fuel oils. Note: Total supply equals domestic production plus imports. Total demand equals domestic demand plus exports. Data on demand for refined products are based on refinery shipments.

Crude Oil Runs to Stills and Total All Oils (Bbls.)

First 2 months—	Total imports§	Total exports§	Total crude to stills	Per cent yield gasoline‡	Nat. gasoline production	Total supply all oils*	Total demand all oils*	Stocks all oils Feb. 28
1938	7,779,000	27,874,000	186,079,000	46.87	8,225,000	216,952,000	198,359,000	582,579,000
Daily average	131,800	472,400	3,153,800	.....	139,400	3,677,000	3,362,000	.....
1937	5,913,000	22,044,000	179,163,000	.....	7,297,000	205,424,000	197,494,000	526,576,000
Daily average	100,100	373,600	3,036,600	.....	123,600	3,481,000	3,347,000	.....
Increase, 1938	1,866,000	5,830,000	6,916,000	.....	928,000	11,528,000	865,000	56,003,000
	31.5%	26.4%	3.8%	.....	12.7%	5.5%	.4%	10.6%

*Total all oils includes crude and refined products, natural gasoline and benzol. †Decrease. ‡Includes natural gasoline blended at refineries. §Includes crude oil and refinery products. In case of imports includes receipts in bond and for domestic use. All data based on Bureau of Mines reports.

Pacific Coast Needs More Curtailment

By L. P. STOCKMAN

LOS ANGELES, Calif., Apr. 11.—Pacific Coast marketing conditions after a year of comparative stability reflect fundamental weakness becoming more apparent weekly. The explanation lies in subnormal demand for all petroleum products plus overproduction. The exigencies of the present situation demand that production of crude oil be immediately cut to at least 625,000 bbls. daily for a period of 60 days in order to afford relief to a storage situation.

It is obvious the recommendations of the Bureau of Mines have been entirely out of line with existing conditions. The monthly indicated demand estimates of the Bureau of Mines must either be immediately revised or entirely discarded by the Central Committee of California Oil Producers in order to prevent a repetition of the chaotic conditions that existed before the balancing of supply and demand in 1937.

That a substantial disparity has existed between actual demand and the indicated demand as compiled by the Bureau of Mines is evidenced by the fact that California crude oil production during the month of February, the last data available, averaged 735,991 bbls. per day and that crude and refined oil stocks during the same period accumulated at the rate of 208,692 bbls. per day indicating an actual demand including offshore shipments of only 527,299 bbls. daily. The bureau's indicated demand for the month of February which includes a small allowance for gasoline accumulation was 693,700 bbls., an excess of 166,401 bbls. above actual demand. Approximately 42,291 bbls. per day of this excess was due to overproduction induced to some extent by the exaggerated estimate of the bureau. Similar wide discrepancies between the bureau's indicated demand and actual consumption existed during December, 1937, and during January and March, 1938. The Central Committee has recognized this fact to some extent when adopting the monthly recommendations of the bureau and has taken the precaution of instructing the umpire to allocate a figure far below the indicated demand as computed by the Bureau of Mines.

Consumption Down

The Bureau of Mines has erred in its calculations for the past several months by failing to recognize that the Pacific Coast has been affected adversely by several important factors. These dominating influences include the existing depression in business, ship tie-ups because of strikes, loss of a large part of its bunkering business resulting from removal of ships from regular runs and "unusual" climatic conditions. Demand for petroleum products in Pacific Coast territory has shown a consistent decline during the past several months and consumption during the first few months of the current year is substantially below similar requirements in 1937. Serious flood conditions early this year substantially reduced consumption of natural gas, fuel oil, gasoline and other petroleum products and it will take several months to fully recover the lost business. Decreased bunkering business has been an important factor in the lower consumption and this is one of the primary reasons for the consistent accumulation in fuel oil stocks. Offshore shipments of fuel oil to the East Coast for domestic consumption and movement to foreign countries is substantially below similar liftings last year.

Shipments and Sales

Total offshore shipments during the year to date are higher than liftings during the same period in 1937 although there has been a marked change in the individual segregations. Crude oil shipments to foreign countries are substantially higher than last year but fuel oil on the other hand shows a marked decrease. Gasoline, diesel, kerosene and lubricants are also substantially lower this year than last year. Export shipments of crude oil are almost twice as large as last year whereas liftings of fuel oil in the export market are only slightly better than one-half. This only represents liftings from California ports for the first three months of 1938 and consequently the various commodities may register changes later in the year. Marketers anticipated a larger offshore movement than has occurred during the first three months of the current year and have no explanation for the decrease. Crude oil shipments are the only item that has been running true to expectations and because of the Mexican situation California's export business will be watched very closely during the next several months.

In the local market prices of all commodities are showing a tendency toward weakness. Independent refiners and marketers are making a concerted effort to straighten out gasoline prices in southern California territory where retail quotations have been declining for the past several weeks. Major buyers are still holding prices firm but it is not definitely certain that this group will be able to maintain the existing price structure of crude and refined oil. One large marketer recently began making a number of long deals with resellers and as a consequence acquired some additional pump outlets. This practice of stepping up the reseller's differential has precipitated several gasoline price wars in the past and thus the present action is full of dynamite especially in view of existing conditions. Fuel oil prices were reduced late last year and recently major marketers reduced the price of diesel 1 cent per gallon at all Pacific Coast ports in car load quantities. The reduction mentioned in fuel oil ranged from 10 to 15 cents per barrel.

There has been some discussion among California marketers during the past week regarding the possibility of Mexican crude oil, as a result of the expropriation of American and British properties by the Mexican government, supplanting the crude oil exports from California to Japan. It was generally agreed that the Japanese market might absorb some Mexican crude oil later in the year if the situation remained unchanged in Mexico but that it cannot exert any great affect on California exports of gasoline, diesel, and light refining crude oil. A large part of this light refining crude oil comes from the Kettleman North Dome field and is highly desirable from a Japanese standpoint because it yields a high recovery of gasoline. Octane rating is secondary to maximum recovery of gasoline in the Japanese commercial market.

Huntington Beach field in California. Row of wells at right drilled on railway right of way adjoining ocean beach

Snider-Triangle

Western Petroleum Refiners Association Final Program

L. D. BETZ

FRANK PRAEGER

W. W. SCHEUMANN

DR. E. R. SMOLEY

Final arrangements for the program of the twenty-sixth annual meeting of the Western Petroleum Refiners Association at Hot Springs, Ark., April 25, 26 and 27, were completed last week and announced by A. V. Bourque, secretary-treasurer.

Monday, April 25, 10:00 a.m., registration.

1:15 p.m., technical session: L. D. Mann, Cities Service Oil Co., presiding.

Introductory remarks, Emby Kaye, Idaho Refining Co., chairman manufacturing committee.

"True Vapor Phase Process," Frank Praeger, Alcorn Combustion Co., Philadelphia.

"Pawhuska Road Tests for Vapor Lock, Octane and Fuel Losses," W. W. Scheumann, Cities Service Oil Co., Tulsa.

(Discussion will follow each paper.)

Tuesday, April 26.

9:15 a.m., technical session: J. J. Allinson, Lion Oil Refining Co., presiding.

"Economics of Combination Cracking Versus Separate Topping and Cracking," Dr. E. R. Smoley, Lummus Co., New York.

"Water Treating for Prevention of Scale, Corrosion and Organic Growths," L. D. Betz, W. H. and L. D. Betz, Philadelphia.

12:30 p.m., general session and luncheon. H. T. Ashton, Socony-Vacuum Oil Co., Lubrite Division, presiding.

"The Law and the Profits," Harvey T. Harrison, attorney, Little Rock.

President's annual address, C. M. Boggs, Kanotex Refining Co.

"Business—Government—Public: Relations, Objectives, Responsibilities," Glenn Griswold, vice president, McGraw-Hill Publishing Co., New York.

"This Day Our Daily Job," Whiting Williams, industrial relations counsel, Cleveland.

8:00 p.m., Dinner dance (informal).

Wednesday, April 27, general session:

10:00 a.m., Business meeting (open).

Committee reports: Committee on posting own tankcar prices; committee on nominations.

Election of officers and directors.

Meeting of board of directors.

12:30 p.m., Luncheon: Roy B. Jones, Panhandle Refining Co., presiding.

"America's Future Brightness," B. C. Forbes, editor and publisher, Forbes Magazine, New York.

"Emphasis on Marketing," James R. Adams, vice president, MacManus, John & Adams, Inc., Detroit.

WHITING WILLIAMS

GLENN GRISWOLD

JAMES R. ADAMS

B. C. FORBES

THE MARKETS*

CRUDE OIL: *The Texas Co. made adjustments in low gravity schedules for Gulf Coast area to conform with prices paid by other companies. Proration made effective by several crude buyers expected to reduce crude output in Mid-Continent last half of April. Latest reports indicate present production for entire country about 100,000 bbls. in excess of current demand.*

REFINERY: *Movement of refinery gasoline continues to show seasonal gains with both inland and coastal markets firm. Natural gasolines firm. No important changes in other products.*

TANK-WAGON AND POSTED DEALER: *The few changes indicate sellers endeavoring to bring about normal prices in gasoline sales.*

FINANCIAL: *Most oil stocks recovered one or more points from lows of previous week. Average of 30 representative stocks for week ending April 9: High, 26.99; low, 24.36; close, 26.84. Week ending April 2: High, 25.14; low, 22.69; close, 24.64.*

**Detailed information in market section.*

CONSOLIDATED OIL CORP. *reports for 1937 net income of $20,809,295, after all charges, equivalent after preferred dividends to $1.48 per common share, compared with $16,728,930 or $1.18 per share in 1936.*

MID-CONTINENT PETROLEUM CORP. *reports for 1937 net income, after all charges, of $5,304,877, equivalent to $2.86 per common share, compared with $4,777,578 or $2.57 per share in 1936.*

Obituaries

WILLIAM L. RHODES, 38, of Coleville, Pa., died on April 4 of injuries received in an automobile accident near Bradford, Pa. Deceased was a producer in the Bradford field.

ROBERT JAMES BURNS, vice president and general manager of Grease Creek Petroleums, Ltd., and associated with several other Alberta oil companies, died at Calgary, Alberta, recently.

W. L. THOMAS, 57, Huntington Beach, Calif., oil man, died at Pomona, Calif., on April 4. He was a native of Titusville, Pa., and had operated in Pennsylvania, Montana and California.

J. PAUL TURNER, 53, employe of Arkansas Fuel Oil Co., died April 4 at Shreveport, La. He was a native of Martinsville, Ohio.

GEORGE C. PRIESTLEY, 76, retired oil operator, died at Titusville, Pa., April 5. One of his earliest employers was Sam Q. Brown, president of Tide Water Oil Co. Mr. Priestley was associated with Barnsdall Oil Co. for 20 years, was an executive at one time of Cities Service Co. and about 1909 was reputed to be among the largest individual operators in Oklahoma, selling his holding to an English syndicate in that year.

WILLIAM B. FLYNN, 48, former Tulsa oil executive, was fatally injured when his car crashed into a culvert near Baton Rouge, La., last week. For several years he was an independent operator in Texas and then worked in South America until he returned to Texas where he operated independently. He joined Standard Oil Co. of Kansas later and after several years went to work for C. J. Wrightsman.

Typical aerial photographic mosaic showing surface formations over large area. Scale: 1 inch equals 2,000 feet

Aerial Photographic Mapping in the Exploration for Oil

By JAMES ATKINSON
Edgar Tobin Aerial Surveys

A decade ago aerial photography to the oil business was merely an unproved innovation in the attack on the increasingly serious problems of wide area geological exploration. The early results in securing land information by the aerial photographic mosaic method, while high in cost and without mapping accuracy, showed enough promise as to cause the oil business to support and encourage its further pioneering and development. In particular, the method then seemed to be the only possible answer to the general mapping problem in that large area in the southern United States occupied by Texas and Louisiana, which was both the most favorable field for oil search in the United States, and at the same time the most deficient in mapping suited to the oil industry's needs.

This year there is available to producing companies operating in the southern United States, and in substantial use by many of them, a system of aerial mosaics covering some 250,000 square miles of potential or actual oil-producing lands. Ten years and more removed from the original product offered the oil business, these mosaics go immeasurably further in that they are maps in the engineer's meaning of the word—as well as a photographic record of all land surface features of use to the geologist in search of structural indications. Ways and means have been developed for applying to the photographic mosaic those same methods of scale control and geodetic alignment characteristic of best practice in map construction by the conventional ground methods. The controlled photographic mosaic has thus become standard equipment in all phases of geological and geophysical exploration. Its application as a means of surface interpretation has materially widened, and given increasingly valuable results with improvements in the technique of study, and with the better developed recognition of the significance of land detail as shown by the aerial photograph.

The controlled mosaic now serves not only as the ideal guide for planning and conduct for all classes of geological and geophysical operations, promoting speed and thoroughness of coverage, but also as an accurate base for recording of the exploratory data acquired.

The controlled aerial mosaic serves the engineer as an illuminating and accurate working base when he is planning to survey a lease block, to make well locations, to inform himself on all available transportation routes for developing a prospect, to build new roadways where needed, or to locate pipe lines.

In the solution of the title problems, the engineer and the attorney find on the controlled mosaic all existing physical features indicating tract occupancy, such as fence and brush lines, roads and streams; and any conflict between tracts as occupied and as delimited by deed description are readily suggested. Hence forewarning is given of any conditions of occupancy which might jeopardize lease or mineral ownership.

Space prevents anything more than this brief mention of some of the primary applications of the controlled aerial mosaic; but those familiar with the mechanics of oil exploration and production will appreciate the almost countless other ways in which aerial photographic mosaics contribute to convenience and efficiency in all phases of operations.

Complementary Mapping

In addition to its usefulness in direct application the controlled aerial mosaic, with its features of scale and goedetic accuracy, has given rise to complementary types of mapping which provide further service of a nature indispensable to present-day producing operations on any scale, great or small. These types are ownership mapping and regional control mapping.

In Texas and Louisiana where greatest producing activity has centered for many years ownership mapping has always been an especially acute problem. The makeshift, inaccurate character of the surveying of the land accompanying its original distribution and settlement is well known to everyone concerned with oil operations in these areas in present times. This basic element of error led to further confusion in land ownership records as the original parcels were subdivided and sold off; the present state of affairs resulting because such subdivisions were almost always predicated on the erroneous survey descriptions of the original parcels. Hence, when the areas referred to drew major attention as oil territory, the prevalent state of conflict in the property records became apparent in a painful way. For many years the industry was forced to abide with ownership mapping as based solely on the property records and reflecting their confusion; since no economically feasible means existed of learning the true state of ownership or occupancy on any large area of land, and hence of clarifying the property record conflicts.

This condition became a prolific source of litigation and other expensive difficulties as oil-finding activity expanded; and it carried with it constantly the hazard of loss of valuable properties, originally acquired by a lease or purchase in good faith.

However serious this situation, there was far too much territory involved even for contemplation of an effort to straighten it out by ground surveys because of the time and cost elements. The ground survey method was necessarily confined, and still is, to the individual prospect. The large problem—building accurate ownership maps over large areas—was necessarily left undone for want of adequate ground control data.

Controlled Mosaics

This problem has in recent years been successfully met—both from the engineering and economic standpoint—by controlled aerial photographic mosaics. They provide a base showing in full the details of existing physical boundaries of occupied land tracts—all in the same relative position as on the land surface itself. On such a base the nature of the property record errors are brought to light and disposed of; and the desired result is obtained of developing an ownership map reflecting correct occupancy.

Producing ownership maps in the cartographic form in which they are now available proved a relatively easy technical matter.

The recognition given this ownership mapping method, and what it has meant in the way of performance to producing companies operating in Texas and Louisiana, would make a long account were it to be covered in detail. For present purposes it can best be indicated by pointing out that more than 60,000 square miles of ownership mapping so made has been completed in Texas and Louisiana by direct commission of the oil business. The work is still going on at an increased pace; and a vast amount remains to be done in these two states alone. In course of time it will doubtless come about that all areas of promise where the property-record situation demands it, will be made subject to the method of ownership mapping by photographic mosaic control. The ultimate goal will be elimination of the handicap of untrustworthy ownership mapping in any territory undergoing or to undergo the search for oil.

Regional Correlation

In the states of Texas and Louisiana, those same conditions which motivated the development of ownership mapping from the aerial photographic base, had left the exploration branches of the oil-producing business without that adequate mapping of the permanent land line base essential to realizing on the possibilities of regional correlation of available geological information. With this need emphasized by the expansion of exploration activity and the consequent additions to the fund of workable information, the project of building, in cartographic form, a sys-

tem of regional base maps from the controlled photographic mosaics was inaugurated at the instance of the oil business. This work, which started some six years ago, and which is still in process, has to date resulted in approximately 120,000 square miles of regional control mapping, all of which has been put into active use as rapidly as produced. This present coverage includes that part of Texas east and south of the Balcones Fault zone and all of Louisiana south of the thirty-first parallel.

Since this coverage of regional control mapping has inherited the same features of local and geodetic accuracy built into the photographic mosaic base from which it derives, the great "guess" as to positional accuracy in regional correlation work has been removed. On this system of base maps the elements of distance and direction are no cause for concern. The hazard of cumulative error characteristic of regional control mapping attempted without benefit of a sound horizontal base, is obviated.

The foregoing can at most be considered only a generalized account of what aerial photography has done and is doing in the service of oil production objectives. Its present position as a most useful if not indispensable implement gives further evidence of the oil industry's readiness in adopting and supporting every medium presenting itself whereby it may more efficiently do its work.

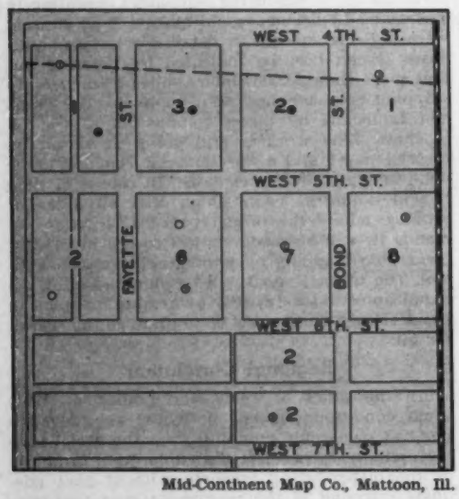
CENTRALIA WELLS

(Continued from Page 61)

together in 10 acres comprising the NE SE NE of section 13 came in for 225 bbls. and 150 bbls., causing new work to pop up on closely spaced locations.

In the latter part of March exploratory work in Centralia worked east into Township 1n-1e. Marion County, while wells from 100 to 449 bbls. a day in initial production followed one another inside Centralia, but all in Clinton County, in the east half of the east half of section 13.

At the close of March there were three rigs up and 54 wells drilling in the Centralia field, and a week later 29 operations were started in the field ranging from locations to first reports on wells drilling. The new work has far outstripped the completed work. Close to 80 operations may be completed within a month in this field and many of them are on city property and closely spaced. Fourteen town-lot wells are included in the 29 new operations above mentioned,

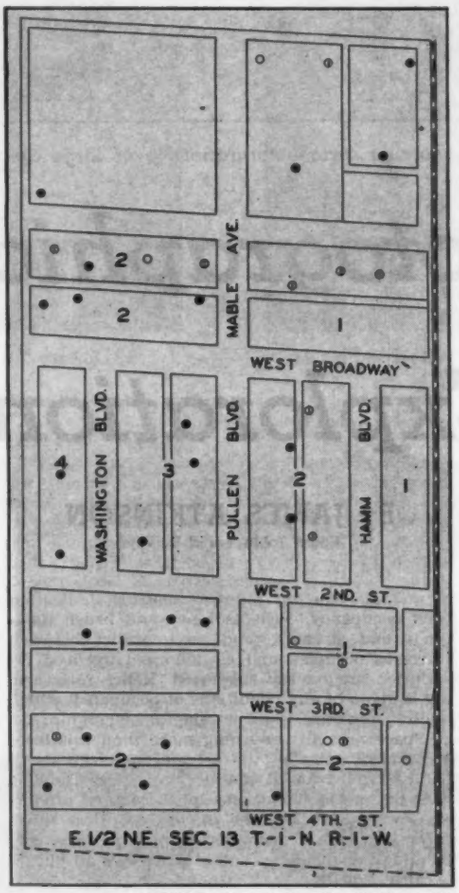


Mid-Continent Map Co., Mattoon, Ill.

Northeast 40 acres of the southeast quarter of section 13-1n-1w, city of Centralia, on which 10 locations are "spotted." Reports of six more were received too late for a place in the picture

and they are all in the east half of the east half of section 13.

There are no spacing rules in the Illinois fields



Mid-Continent Map Co., Mattoon, Ill.

Thirty-nine wells and locations on 80 acres on the west side of the city of Centralia. A late report received after the engraving was made added six locations and rigs to the picture, or 45 in all

that will interfere with the crowding of wells in the city limits, and while there are now no less than 45 locations and wells on 80 acres (east half of the northeast quarter of section 13-1n-1w) and no less than 16 wells and locations on the 40 acres comprising the northeast of the southeast quarter of section 13 they do not complete the picture. There will be more—how many more will depend on the result of the abnormal drainage of the sand from the too many operations already started.

GASOLINE STOCKS

(Continued from Page 62)

000,000 bbls. at the end of the year.

Neither the crude-oil producers nor the regulatory bodies can alone be held entirely responsible for this large excess of crude-oil production. Refiners of course, must accept part of the responsibility because more times than not, perhaps, crude-oil producers and regulatory bodies were influenced by refiners' own nominations of their anticipated requirements, in setting production allowables.

Part of the difficulties in which we now find ourselves with regard to gasoline are also directly traceable to the industry's efforts to supply the demand for furnace oils in a market definitely out of relationship to the market for gasoline and the yield of these two products from crude oil. Of course, one cannot forecast the weather, and to that extent, perhaps, can the refiner be excused. It seems reasonable to suggest, however, that the industry could watch the trend of the demand for gasoline and other products somewhat more closely and also the relationship between current levels of gasoline inventories and the working-stock and seasonal requirements thereof. This contention seems well founded after a comparison is made between necessary working stocks and seasonal requirements of about 78,500,000 bbls. on March 31 of this year, and actual inventories of about 93,000,000 bbls. for the country as a whole and, for the area East of California, working-stock and seasonal requirements as of the same date of not more than 64,000,000 bbls. to 65,000,000 bbls., as against estimated actual inventories of 76,000,000 bbls.

After giving due consideration to the current and prospective trends of demand for gasoline and other products outlined earlier and also current levels and trends of inventories of both crude oil and refined products, it becomes our opinion that economic operation calls for the production of not more than 2,600,000 bbls. of crude oil daily in the area east of California during April and May, and probably throughout the second quarter of the year. If conditions should improve more rapidly than anticipated, an economic balance may be reached before the end of June; but, on the basis of what now seems reasonable to expect, all things considered, economic levels of crude-oil production do not appear to exceed the figure indicated, throughout the second quarter.

We have set out below our estimates of the inventories of finished and unfinished gasoline as of March 31. Figures indicating the actual inventories as of that date will be available in the U. S. Bureau of Mines monthly petroleum statement for that month, which should be available during the second week of May. There is also shown below actual inventories of finished and unfinished gasoline as indicated by the U. S. Bureau of Mines as of June 30, 1937.

Were each refiner, in the area east of California, to adjust his schedule so that his inventories will at the end of June of this year not exceed those which he had on hand on July 1, 1937, an economically desirable position will have been attained; and if such accomplishment were to be followed by runs to stills based upon the economic requirements of July, August, and September, gasoline inventories at the end of the summer season would be not greater than required for economic working stocks.

INVENTORIES OF FINISHED AND UNFINISHED GASOLINE—U. S. BUREAU OF MINES BASIS

(Barrels of 42 gallons)

	March 31, 1938 (estimated)	June 30, 1937 (USBM)
East Coast	23,510,000	19,442,000
Louisiana Gulf	3,130,000	1,697,000
Texas Gulf	15,140,000	9,921,000
	41,780,000	31,060,000
Indiana-Illinois-Kentucky	16,310,000	13,633,000
Oklahoma-Kansas	8,250,000	8,288,000
North Texas	2,730,000	2,300,000
North Louisiana-Arkansas	690,000	647,000
	27,980,000	24,868,000
Appalachian	3,820,000	3,174,000
Rocky Mountain	2,520,000	2,033,000
East of California	76,100,000	61,135,000
California	16,800,000	14,148,000
United States	92,900,000	75,283,000

The Columbia System

The Columbia Gas & Electric Corp. has published a history of the Columbia System by Albert F. Dawson, a well illustrated volume with photographs of its office buildings, plants and stations throughout the area served, portraits of Philip G. Gossler, chairman of the board, and other officers and directors, and a detailed account of the origin and development of the corporation.

Next Move in Mexican Case Is Up to Cardenas Government

By H. STANLEY NORMAN and HENRY D. RALPH
New York Washington

The next move in the relations between the United States and Mexico over the seizure of American oil properties is apparently up to the Mexican government, since state department officials have declined to comment on the situation for more than a week. There was no official reaction at the state department to the announcement that the British government has demanded that Mexico return oil properties owned by British interests. The British protest took the view that the expropriation exceeded the bounds of international law, the position taken by both British and American companies in filing action in the Mexican courts for a return of their properties.

President Cardenas was reported to have refused the British demand.

W. R. Davis, New York, who contracted to buy oil from oil wells the government owned prior to the expropriation order, some months ago sold the government $1,080,000 worth of drilling and pipe line equipment against government oil.

In an interview in Mexico City, he said:

"I have made no propositions and none have been made me. But before I made any deal to handle the oil I would want to be sure the expropriation was going to stand up, that there was not going to be a revision of the expropriation and that the companies will be properly paid for their properties."

He added: "They (the government) will find out sooner or later we are the ones that have the ships and the markets."

Mr. Davis said his companies owned 17 tankers and had 10 more under long contract.

The Norwegian tanker Marie Maersk proceeded from Tampico to Tuxpan Sunday to load 100,000 bbls. of oil, the first of 1,000,000 bbls. for which Mr. Davis was said to have paid an average price of $1.05 per barrel.

Mr. Davis said he was getting out the remainder of the oil in 13 cargoes before May 22.

From a physical standpoint, conditions in Mexico remained unchanged. Agitation was started to include properties of Mexican Gulf Oil Co. in the expropriation decree. Practically, the fields remained idle, storage tanks were full, refineries inactive and shipments were almost at a standstill.

Direct negotiations with individuals and foreign governments for disposal of Mexican crude by the government petroleum sales agency were continued, but little tangible developed. John Bradshaw of Dallas, Texas, head of Hercules Oil Co., said on his return from Mexico City he had arranged to purchase 10,000,000 bbls. Negotiations of Francis W. Rickett, British promoter, and Bernard E. Smith, Wall Street broker, with the Mexican government continued, but the impression is abroad no definite deal has been arranged. When Rickett and Smith visited New York over the weekend of April 2-3 a skeleton contract was in their hands, but question still exists whether an actual market is in near prospect.

There is more evidence part of the supply formerly obtained from Mexico will be filled, at least temporarily, from the Gulf Coast. One large refiner and producer in Mexico inquired and possibly purchased three cargoes of gasoline on the Gulf Coast last week.

It is estimated Mexico exported about 4,500,000 bbls. of gasoline in 1936 and 1937. Remainder of the 26,000,000 bbls. of petroleum exports in 1937 consisted of fuel oil, gas oil, asphalt, kerosene and other products. With exception of gasoline, it is believed Mexican exports can be supplanted largely from the Dutch West Indies, but in producing sufficient fuel oil and heavy products to replace the supplies normally drawn from Mexico it is calculated the Dutch West Indies refineries will provide only a part of the 4,500,000 bbls. of motor fuel previously available for the South American market. Therefore, it is estimated that from 50 to 60 per cent of the Mexican motor fuel exports in 1938 will be drawn from the Gulf Coast refining district unless current conditions are revised.

No Sign of Modification

There has been no indication that President Cardenas intends to modify his expropriation decree. Suits were filed in the Mexican courts last week by the oil companies. A plea for annulment of the ruling of the Federal Board of Conciliation and Arbitration was set for hearing by the First District Court of Mexico City for Sept. 29, nearly six months hence. Further delay under Mexican law is possible. Previously the companies filed proceedings in the Second Federal District Court to declare the executive decree unconstitutional, alleging 22 specific violations by the government of the 1917 constitution. The companies entertain little hope their court proceedings will meet with success. The United States government, however, is known to desire a complete exhaustion of all legal steps in Mexican courts.

Gustavo Espinosa Mireles, head of the recently created Petroleum Sales Corp. for Mexico, was reported meeting all comers on the question of selling Mexican oil. It was said Mexico had given strong implication that a policy of "cash and carry" will prevail in its sales negotiations. The new official sales agency has been instructed by ranking government officials to set aside 20 per cent of all proceeds for indemnification of the companies. Payment for properties by this method has been rejected in theory by the companies. Pushed to the market level necessary to attract customers, the payment of claims from 20 per cent of proceeds would fall short of the demands by all companies concerned and would not even meet the modified expectancy voiced originally by Secretary Hull.

No examination was made in this country last week of President Roosevelt's remarks in Warm Springs, Ga., that adequate indemnification would involve only recovery of investment. The Mexican press seized upon President Roosevelt's remarks as a basis for speculating on the amount due the oil companies. The Excelsior published an article asserting that Miguel Manterola, Mexican economist, had determined the total value of the United States and British companies expropriated as only 200,000,000 pesos. Another leading newspaper, the Universal, displayed an article by the same economist saying payment should not exceed 100,000,000 pesos. Labor unions hold the companies owe 140,000,000 pesos in dismissal wages as a result of the government cancellation of labor contracts, and a Mexican court ruled April 2 against British Mexican Eagle Oil Co. request for an injunction with regard to the 5,000,000 pesos in back taxes held due.

The British investment in Mexico is considerably heavier than that of American companies. In recent years the Mexican Eagle unit has poured millions into Mexico oil properties and buildings, while American companies have curtailed spending in Mexico because of political and labor unrest. Japan as a consumer of at least a part of the nationalized Mexican production has not been entirely eliminated. During the past week, Jorge Viesca y Palma, who represented himself as the principal stockholder in the Chontla Co., organized two years ago, said Japanese offered to buy all, or part of his holdings. At the time of the expropriation Viesca was negotiating with Mexican Eagle for an outright sale or sub-lease of his properties in the vicinity of Minatitlan in the State of Veracruz, near the Royal Dutch holdings.

The Chontla Co. is not the only Tehuantepec Isthmus property in which the Japanese were reported interested. Careful investigation over three years by British and American companies has convinced their officials—although it was said they lacked complete proof—that Japanese capital was behind Compania Veracruzana, a corporation ostensibly controlled by Mexicans.

One of the stumbling blocks in negotiations between Rickett and Smith with the Mexican government was reported to be President Cardenas' dissatisfaction with the low price of 63 cents per bbl. offered. Sudden recall of Dr. Francisco Castillo Najero, Mexican Ambassador to the United States, for a conference with President Cardenas was linked with a possibility that Dr. Castillo might be instructed to sound out Washington's attitude on sale of oil to Japan, Germany and Italy.

It is becoming increasingly obvious Mexico must better the prices of 50 to 60 cents per bbl. offered from most quarters, provide other means of payment or drastically lower the values of expropriated properties. Assuming all export markets could be retained for Mexico, regarded as an impossibility, the government could obtain only $15,000,000 for 25,000,000 bbls. of exported petroleum at the average of 60 cents per barrel. Some products will bring more, while others probably will bring slightly less, but the revenue still would be inadequate to service the claims of $450,000,000 at a reasonable rate of interest. The revenue in sight, assuming the most favorable conditions, would provide very little toward reduction of principal.

Refinery Expansion

Newly Formed Montana Company To Erect 3,000-Barrel Plant

DENVER, Colo. — Organization of the Producers Refining Co. was completed last week at Shelby, Mont., the company being organized as a Montana corporation with an authorized capital of $1,000,000. Negotiations are now under way for the contracting of crude oil production in the Pondera, Kevin-Sunburst and Cut Bank fields. The company plans to erect a complete 3,000-bbl. refinery, the site of which has not yet been decided. Offices of the company will be established in Shelby.

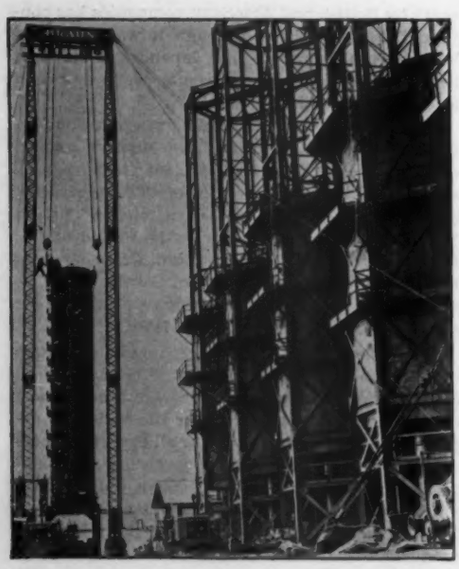
The organizers and incorporaters are: D. M. Drumheller, Jr., W. E. Burks, and George H. Hutchings of Cut Bank, Mont.; James W. Johnson, G. C. Hoyt, H. M. Kluth, and C. O. Bohn of Shelby, Mont.; O. A. Nepstad, Ferdig, Mont.; and C. N. Wrighter, Kevin, Mont.

Three East Texas Plants To Be Dismantled

SHREVEPORT, La.—General American Oil Co.'s three refineries in the East Texas field have been sold and are to be dismantled. The three plants operated from 1933 to 1937. The first to close was the Arp plant, which ceased operations in April, 1936, ran for a month during January, 1937, and then discontinued operating permanently. The Overton plant discontinued in January, 1937, and the Gladewater plant in September, 1937. The Arp and Gladewater refineries had daily capacities of 4,000 bbls. and the Overton plant 5,500 bbls.

New Jersey Company Buys Site Adjacent to Bayonne Plant

NEW YORK.—Standard Oil Co. (N. J.) has added more than 5½ acres to its holdings at Bayonne, N. J., adjoining the site of the company's most extensive refinery on the Atlantic Coast. Two parcels of land were purchased by Standard last week from Tide Water Associated Oil Co. in what is known as the old Constable Hook area. Tide Water also has a refinery at Bayonne adjacent to the Standard of New Jersey grounds. Acquisition of the land was for the purpose of providing room for immediate and future expansion of refining facilities at Bayonne.



Erecting a 65-ton bubble tower at Richfield Oil Corp.'s Watson, Calif., refinery. At right are vertical cracking furnaces with frames 132 feet high. Richfield's plant modernizing and enlargement program is now well under way, and it is estimated that approximately $5,000,000 will be expended on the work.

Turner Valley Crude Being Moved to Manitoba Plant

CALGARY, Alberta. — Anglo-Canadian Oil Co. has commenced tankcar shipments of Turner Valley crude to the newly completed Central refinery at Brandon, Manitoba. Initial shipments were at the rate of 400 bbls. per day. The company recently leased the refinery on a basis of $2,500 annual rental. Present capacity of the plant is 1,000 bbls. daily, but the company plans to increase it to 1,800 bbls.

Federal Trade Commission Hearing on Reclaimed Oil

WASHINGTON, D.C.—The value of reclaimed oil as a lubricant and the relationship between the business of reclaiming lubricating oil and the distributors of virgin oil will be considered by the Federal Trade Commission during the hearings on its complaint just issued against Gulf Refining Co. of Pittsburgh. In its complaint the commission says many concerns produce a satisfactory lubricating oil by re-refining crankcase drainings and that the Gulf company has unfairly disparaged this product and has engaged in unfair competition in inducing purchasers to prefer its oils to the reclaimed product and by inducing automobile service station operators to refuse to sell crankcase drainings to reclaimers.

The commission declares, "many reclaimed motor oils are as good as so-called virgin lubricating oils. The reclamation and sale of motor oils is a legitimate business engaged in by many honest and reputable corporations, partnerships, and individuals. The motor oils reclaimed by these aforesaid concerns do not contain water, rearend drainings, sulfur, and other materials detrimental to good motor lubrication, and are not colored to camouflage their real identity."

It is expected the case will involve an investigation into the practices of concerns marketing reclaimed lubricants.

New Refineries to Establish Outlet for Montana Crude

GREAT FALLS, Mont.—Construction of Inland Empire Refineries, Inc., refinery at Spokane, Wash., is now under way and the plant is expected to be placed in operation some time in July. It will be of 2,500 bbls. daily capacity and is being constructed under the supervision of Emby Kaye, who recently resigned as vice president of Skelly Oil Co. Mr. Kaye is general manager of the Inland Empire company and of an affiliate, the newly formed Idaho Refining Co. The latter company now has a 1,500-bbl. refinery under construction at Pocatello, Idaho. These two companies have much the same stock ownership as the Wasatch Oil Refining Co. of Salt Lake City, Utah, but will be under separate management.

At Kalispell, Mont., Yale Oil & Refining Co. of South Dakota has a 1,500-bbl. plant under construction, and the plant is expected to be placed in operation within the next two months. Another 100-bbl. plant is also planned for Kalispell, to be built by a new corporation headed by A. H. Harvey of Helena, E. O. Bratsberg and W. A. Ryder of Kalispell, and O. A. Nepstad of Ferdig, Mont. Havre Oil & Refining Co. was also recently incorporated and will take over the Aronow plant at Kalispell. The company plans to have the 100-bbl. plant running within the next month.

Completion of these refineries and the erection of Producers Refining Co.'s 3,000-bbl. plant at Shelby is expected to greatly relieve the crude situation in Montana. North Montana crude lost a good portion of its market outlet several months ago when Canadian refiners ceased taking the crude.

Hamilton, Ontario, Gas Merger Of United and Dominion

HAMILTON, Ontario.—A committee of the Hamilton city council is studying details of the proposal for the merging of the interests of United Gas & Fuel Co. and Dominion Natural Gas Co. in the Hamilton area.

Pipe Line Activity

Alberta Pipe Line Tax

EDMONTON, Alberta.—The Alberta government is increasing the tax on oil and gas pipe lines from 5 to 10 mills on assessed value.

Supreme Court Upholds Tax On Louisiana Pipe Line

The United States Supreme Court has upheld the Louisiana electric power tax law as applied to Arkansas-Louisiana Pipe Line Co. Justice McReynolds dissented.

The lower court had held the tax to be an unconstitutional burden on interstate commerce. The Supreme Court reversed this decision in an opinion delivered by Justice Reed. The pipe line company transports natural gas from Sterlington, La., to Texas and Arkansas. The Louisiana law levies a tax of $1 per year per horsepower on machinery of concerns using electrical or mechanical power who do not buy their power from electric companies paying a tax of 2 per cent of gross which is levied by the same power tax statute.

The Supreme Court said the question was whether a state law imposing a privilege tax on mechanical power production contravenes the interstate commerce clause of the Constitution so far as the tax is applied to an engine used to supply mechanical power to a compressor which increases the pressure of natural gas and thus permits it to be transported to purchasers in other states. The court decided that the law was a revenue measure and that it did not discriminate against interstate commerce.

Derby to Lay a Lateral To Reno County Pool

Derby Oil Co. is trucking in line pipe for a 4-inch lateral from its Bell station in the Burrton pool, Kansas, to the new Simpson sand oil discovery 3 miles southwest of Buhler in northeastern Reno County. The Bell station is on Derby's trunk line to Wichita. The lateral will extend for a distance of 6½ miles, welded and screw-joint construction.

Arkana Transit to Lay Spur To Columbia County Field

SHREVEPORT, La.—Arkana Transit Corp. is reported arranging to extend a 3-mile spur line to the newly opened field in Columbia County, South Arkansas, by Kerr-Lynn Oil Co. last week. The transit company is jointly operated by Ohio Oil Co. and Arkansas Fuel Oil Co. The new field will be connected into the company's Stephens-Haynsville system.

Natural Gas News

Southwestern Gas Measurement Short Course Next Week

The three-day Southwestern Gas Measurement Short Course will open at the University of Oklahoma April 19. The general assembly will be held from 9:30 to 11:30 a.m., Gilbert Estill, Oklahoma Natural Gas Co., chairman of the meter school committee, presiding.

Dr. W. B. Bizzell, president of the University of Oklahoma, will be introduced by J. Y. Wheeler, president of the Oklahoma Utilities Association. W. F. Lowe, secretary, N.G.A.A., will discuss the relation of the Natural Gasoline Association and the Gas Measurement Short Course. E. H. Poe, secretary, Natural Gas department, A.G.A., will speak on "Progress Through Association."

R. W. Hendee, of Colorado Interstate Gas Co., will also deliver an address and Earl Kightlinger, Arkansas-Louisiana Gas Co., will present the report of the committee for study of practical methods.

Cottrell Given A.I.C. Medal For Helium Research

NEW YORK.—Dr. Frederick G. Cottrell, whose research on an inexpensive process for recovering helium from oil well gases made possible its commercial use, has been announced as the winner of the 1938 medal of the American Institute of Chemists.

Presentation of the award, made annually for outstanding service to the science of chemistry in America, will be made at the institute's annual dinner at Atlantic City, N. J., on May 14.

Gas Company Officials Deny Charges at Columbus, Ohio

COLUMBUS, Ohio.—Denials have been entered by 2 natural gas distributing corporations and 10 utility officials at their arraignments in common pleas court on charges precipitated by allegations of fuel adulteration.

Ohio Fuel and Columbus Gas & Fuel Co., now part of Columbia's Ohio holdings, were the corporations accused. Innocent pleas were made by the officials individually and by Attorney Freeman T. Eagleson for the corporations. The officials were released on their own $1,000 bonds.

Indictments two weeks ago alleged that the two corporations rendered false bills to the city and provided an inferior fuel.

Gas Exhibit Being Planned at San Francisco Exposition

Under the leadership of President McKee preliminary financing has been completed for a comprehensive exhibit of the domestic uses of gas at the Golden Gate International Exposition which will open in San Francisco, February 18, 1939. Additional financing and the design, construction and operation of the exhibit will be in charge of the following special committee: R. E. Fisher, vice president, Pacific Gas & Electric Co., chairman; H. R. Basford, president, H. R. Basford Co.; H. L. Farrar, president, Coast Counties Gas & Electric Co.; Don Fleming, manager, electro gas division, Payne Furnace & Supply Co.; C. R. Graham, secretary, James Graham Manufacturing Co., and R A. Hornby, vice president, Pacific Lighting Corp.

Dry Gas Production Lower In Texas During February

Production of dry gas continued to decrease in Texas during February, according to the monthly report compiled by the Railroad Commission of Texas. In February 2,015,536,000 feet of dry gas were produced daily, of which 64.67 per cent was sweet and 35.33 per cent sour. This daily total compared with 2,032,754,000 feet in the previous month and 1,768,241,000 feet daily in February, 1937. Disposal of the dry gas was as follows: To pipe lines and for fuel and light purposes, 29.05 per cent; to lease operations and drilling, 4.43 per cent; repressuring and gas-lift, 2.57 per cent; to gasoline plants, 63.95 per cent.

A total of 144 natural gasoline plants were in operation during February. These processed a total of 2,254,990,000 feet daily of which 27.38 per cent was dry sweet gas, 29.80 per cent dry sour gas, and 42.82 per cent casinghead gas. A recovery of 2,247,129 gallons of natural was obtained daily, or a yield of .997 gallon per 1,000 feet of gas. In addition 295,608 gallons of butane-propane were produced daily. Carbon black plants processed a total of 2,254,990,000 feet of gas daily to produce 1,207,842 pounds of carbon black daily.

Natural Gas Stand-by Proves Value in California

The work done by Pacific Coast gas engineers during the past several years in perfecting a manufactured gas which can be substituted for natural gas in an emergency was amply justified during the February storms which visited southern California. The natural gas transmission line supplying San Diego was washed out in two places, and was out of service from 7 p.m., Wednesday, March 2, to 2:15 a.m., Saturday, March 5. But for the fact that the company maintains a stand-by manufacturing plant ready to go into service on a few hours' notice, San Diego would have been without gas service. While line repairs were being made the plant made 25,000,000 feet of diesel oil gas and gas service was maintained without interruption.

Gas Industry Revenue Up

Total revenue of the manufactured and natural gas industry was $80,714,500 in January, an increase of 1.6 per cent over $79,459,600 in the like 1937 month, the American Gas Association reported.

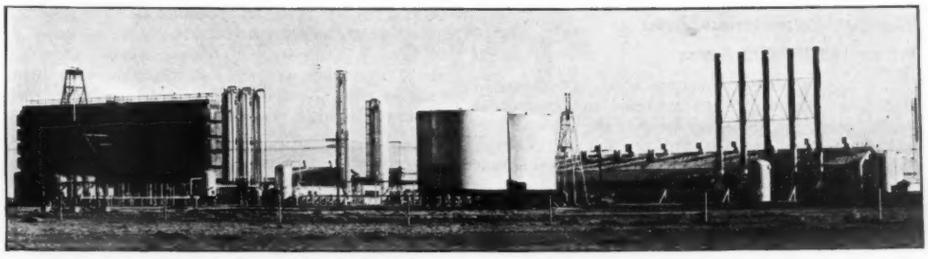
Revenue from domestic customers, including house heating, totaled $57,259,400 for the month, a gain of 3.3 per cent over $55,445,200 in the corresponding period of last year, while revenue of $23,455,100 from industrial and commercial consumers was 2.3 per cent below the $24,014,000 recorded a year ago.

El Paso Gas Rate Argument Before Federal Judge

EL PASO, Tex.—The city of El Paso in an answer to the injunction suit of the Texas Cities Gas Co. asserted the action was filed as a threat to the municipality and an attempt to force an illegal compromise of a rate dispute. Arguments were made before Federal Judge Charles Boynton on a motion to dismiss the restraining order against the new 55-cent gas rate, fixed by the city council.

The municipality contended gas rates are "exorbitant, unjust and unreasonable, and higher for the smaller user than any rates in the state of Texas."

Natural Gasoline



Magnolia Petroleum Co's. New Moore County Plant

Magnolia Petroleum Co.'s new plant near Sunray, Moore County, Texas, which was completed in the latter part of 1937. The plant is handling from 40,000,000 to 50,000,000 feet of gas daily with a recovery of about .3 gallon per 1,000 feet. Erection of the plant required much less time than usual, operation of the plant beginning only 30 days after ground was broken to start construction.

Work Started on Shelby County, Texas, Plant

FORT WORTH, Tex.—Portex Oil Co. of Portland, Ore., has started clearing location for its proposed gas recycling and natural gasoline plant in the Joaquin field, Shelby County, Texas. The plant will process the output from the company's three gas-distillate wells, and residue will be returned to the Glen Rose series. Location of the plant will be on the company's Pickering Lumber Co. lease in the Hanson Survey.

Natural Gasoline Production Decreased During February

WASHINGTON, D. C.—The Bureau of Mines reported a material decline in the February production of natural gasoline. The February daily average was 5,833,000 gallons, 42,000 gallons below the average in January, but 486,000 gallons higher than a year ago. The greatest decreases in February were noted in the Oklahoma City, Panhandle and Kettleman Hills districts.

Stocks increased at refineries and decreased at plants and terminals, the total of 210,714,000 gallons on hand February 28 being 2,772,000 gallons higher than the total on February 1.

Inglewood Planning Gasoline Plant for Wilmington Field

LOS ANGELES, Calif.—Plans for the erection of a natural gasoline plant are being studied by Inglewood Gasoline Co. after having completed a gas survey of 139 wells in the old portion of the Wilmington field. The report revealed that over 12,500,000 feet of gas is being produced daily from the wells.

INTERNATIONAL NEWS

Leading Foreign Firms Suspend Business in North China

The three leading foreign oil firms in North China, Standard-Vacuum Oil Co., Texas Co., and the Asiatic Petroleum Corp. (Shell), all with local head offices in Tientsin, China, have suspended business indefinitely. Opposition to carrying on business with the currency issued by the new Federal Reserve Bank of the "Provisional Government of the Chinese Republic" and lack of transportation facilities in the Japanese-occupied area are understood to be the principal reasons.

It is further believed that the move of the foreign oil firms has been prompted by a recent decision of the Department of Commerce and Industry, Tokyo, to establish a "national policy oil control company" in North China. A draft of the bill was shown to representatives of Japanese oil companies, but details were deliberately withheld from foreign firms.

The objective of the projected national policy firm is to "consolidate" the artificial and natural oil industry in North China, as government officials put it, and to control distribution of oil products there. The company will be capitalized at 50,000,000 yen through joint investment of Japanese oil manufacturing companies (15,000,000 yen in all), South Manchuria Railway Co., North China Development Corp. and Oriental Development Co.

It is further rumored that under the proposed second tariff revision by the "Provisional Government" the duty rates on oil products will be lowered to a still greater extent to allow Japanese refiners to extend their sales in North China.

The situation bears all the marks of a sales monopoly such as has been formally enforced in Manchukuo three years ago, depriving the foreign firms operating there of their profitable marketing business.

Mexican Petroliferous Area Put at 148,260,000 Acres

The Petroleum Bureau of the Mexican Department of National Economy calls attention to an error in translation in the article on Mexican oil operations in the International Issue of The Oil and Gas Journal, December 30, 1937, page 64, where the statement was attributed to the bureau that "the possible oil area in Mexico is estimated at 7,567,015 hectares (18,698,094 acres). Only 100,000 hectares have been exploited up to now."

The paragraph should have read: "As an important indication of the development prospects the oil companies have before them, we may state that out of a total of 7,567,015 hectares (18,698,094 acres) of petroleum lands these companies have under concession, they have up to now succeeded in exploiting only 100,000 hectares (247,100 acres) altogether; i.e., they have still to develop approximately 75 times more than they have so far."

This, of course, was written before expropriation was thought of. The bureau reports "the area estimated as possibly petroliferous in Mexico exceeds 60,000,000 hectares or 148,260,000 acres."

Saudi Arabian Test Delayed By Stuck Drill Stem

California Arabian Standard Oil Co. is attempting to recover stuck drill pipe from its No. 7 Damman, latest producer obtained on the Saudi Arabian mainland. The new well on preliminary test gave indications of being by far the best well yet obtained in Arabia and placed a new value on the productive possibilities of the country forming the western shoreline of the Persian Gulf.

The oil horizon now awaiting production test in the No. 7 Damman is correlated with the deep pay zone discovered on Bahrein Island and gives indication of containing substantial quantities of oil over a considerable area. The No. 7 Dammam is removed from the coastline by several miles and there is a stretch of submerged land for 18 miles dividing the mainland from Bahrein Island.

Results on extended production tests from the shallower pay horizon on Arabian soil have been disappointing. Some of the earlier completions which gave promise of producing 3,000 to 5,000 bbls. per day failed to hold their initial rates and declined rapidly after a few days.

Workers of Tropical Oil Co. On Strike in Colombia

Union workers of Tropical Oil Co., Colombian subsidiary of International Oil Co., through which it is affiliated with Standard Oil Co. of New Jersey and the crews of the company's Magdalena River fleet went on strike April 8 when negotiations for higher pay failed. The company declined to submit the case to arbitration after the unions chose Minister of Government Alberto Lloras Camargo as their arbitrator. The demand for increased wages and signing of a collective contract was rejected by the company.

National police now are patrolling the region. The workers were provided better wages, working and living conditions in a strike in 1935.

Kuwait Oil Co. Appears to Have Pool in Persian Gulf Area

Cement is being cleaned out to bottom in Kuwait Oil Co. No. 1 Burghan, possible new oil field discovery in the Persian Gulf district. After cleaning out to bottom, operators will cement 8-inch casing just above the horizon at 3,682 feet where the well threatened to blow out and produced considerable oil early in March. Another two weeks probably will elapse before the final string of casing is cemented and the well tested. Indications are that the high pressure and oil showing originated from limestone correlating with the regular producing horizon on Bahrein Island, about 250 miles south and slightly east of Kuwait, which is an independent kingdom on the northwestern end of the Persian Gulf. Kuwait Oil Co. is jointly owned by Anglo-Iranian Oil Co., Ltd., and Gulf Oil Corp.

Well in Tarra Field, Venezuela, Flows 430 Barrels Initially

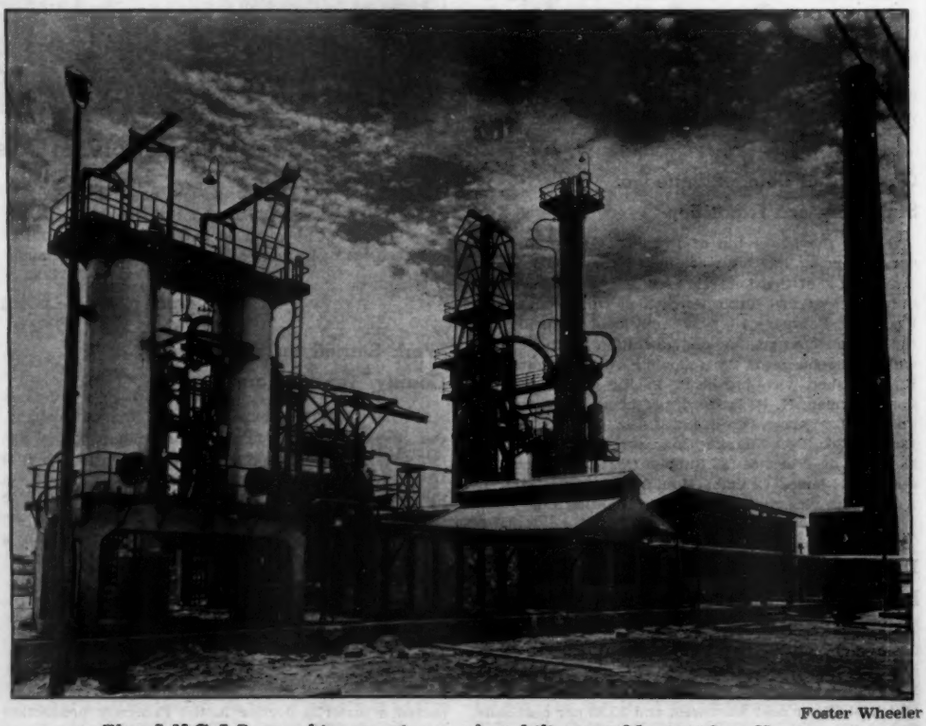
Colon Development Co., Ltd., has completed its No. T-84 in the Tarra (Las Cruces) field in western Venezuela for initial flowing production of 430 bbls. per day through a ¾-inch choke. Tarra field production has been increasing gradually for the past several months as Colon has averaged completion of one new well every 30 or 45 days.

Japan Oil Co. to Extend Its Research Laboratories

The Japan Oil Co. has decided to invest an amount of 2,000,000 yen in the extension of its research laboratory at Kashiwazaki to make intensified studies of high-octane fuels. Upon completion of the researches the Kashiwazaki plant of Japan Oil will produce high-octane gasoline exclusively.

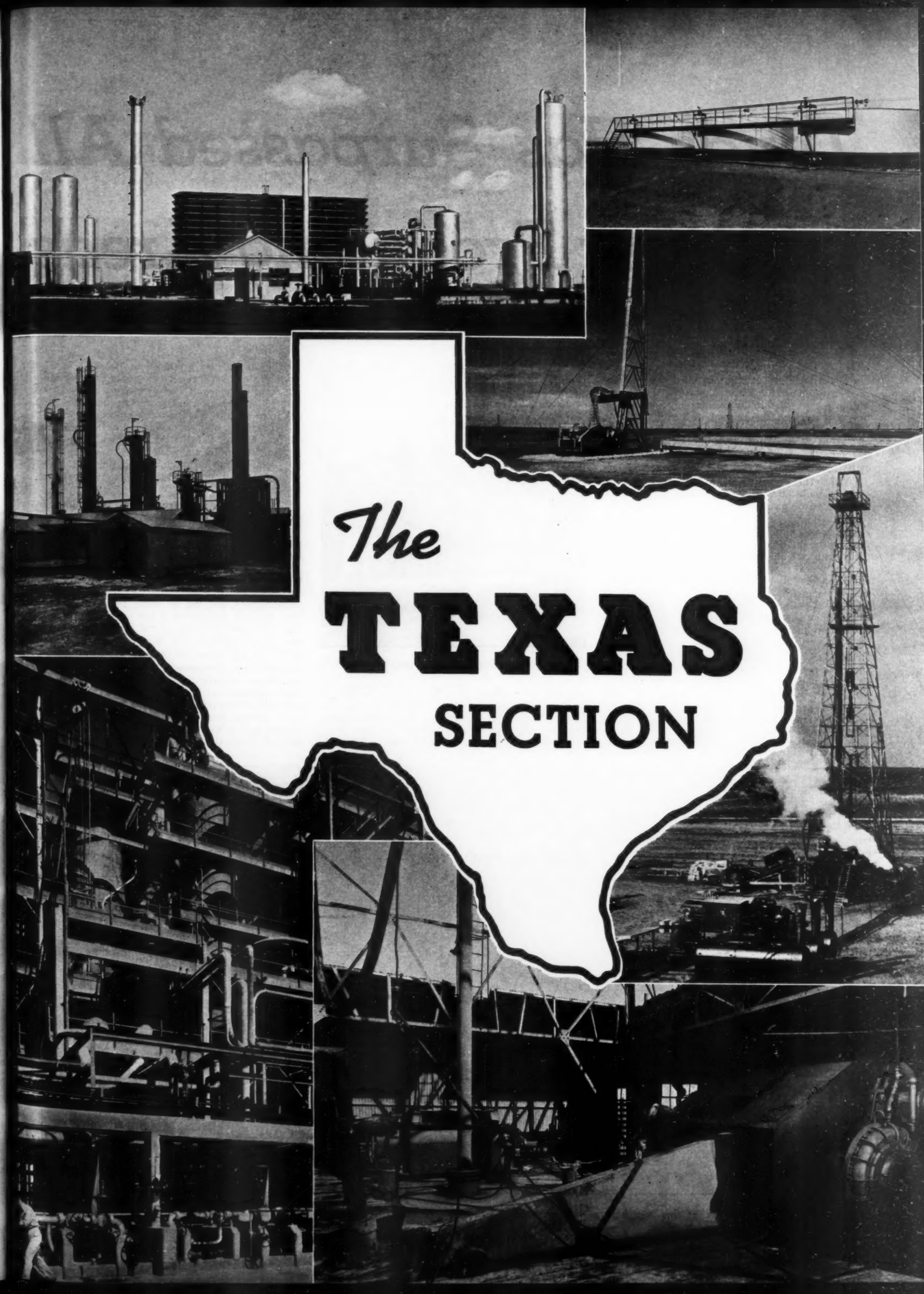
Another venture in the high-octane number field is reported in connection with the Kawasaki refinery of Mitsubishi Oil Co. The fuel will be produced there by hydrogenation of cracking gas. The polymerization plant, under construction since late last year, will be ready for operation shortly.

Because of the delay in the construction of absolute-alcohol plants under the Alcohol Monopoly Law of 1937, the compulsory mixing of alcohol with motor fuels has been postponed until July 1. The mixing ratio has not yet been announced, but it is understood that an addition of 2 per cent alcohol will be the maximum to be made compulsory because of the short supply of alcohol.



Foster Wheeler

The A.N.C.A.P. cracking section and stabilizer at Montevideo, Uruguay


The
TEXAS
SECTION

Texas Has Surpassed All of Other Producing Areas

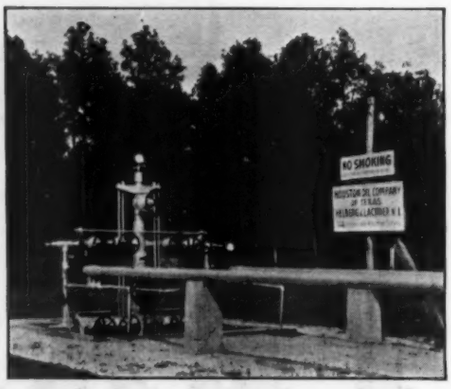
By C. A. WARNER
Houston Oil Co. of Texas

Knowledge of the primary ranking importance of Texas in the oil and gas industry is world-wide. Such preeminent position is held not only by virtue of its present daily production but also through the magnitude of its reserves. Its present rank is in decided contrast with that of a scant 40 years ago when experienced oil men of the eastern United States were inclinde to scoff at its possibilities.

Within this great area of varied topography and climatic conditions are 254 counties, 137 of which produce oil or gas, or both, in commercial quantities.

Texas contains within its boundaries not only the largest oil field and the largest gas field in the world, but also more than 950 producing oil and gas pools from which more than 3,250 individual companies and independent operators are actually engaged in the production of oil and gas. It has also 33,484 miles of oil pipe lines, 10,048 miles of gas pipe lines, 133 refineries, 136 major gasoline extraction plants, and 40 carbon black plants.

From a recorded production of 48 barrels of oil and a few million feet of gas in 1889, Texas has advanced to a total production of 502,964,000 bbls. of oil and over 1,072,754 million feet of dry and casinghead gas in 1937. As of January 1, 1938, Texas was producing approximately 1,318,600 bbls. of oil daily from 78,385 wells. It was also producing 3,051,929,000 feet of gas daily from 39,161 wells, 36,218 of which were producing casinghead gas. Its present daily production and its total production during the last few years is no true index of the real productive capacity of the state. It represents, rather, cooperation between the industry



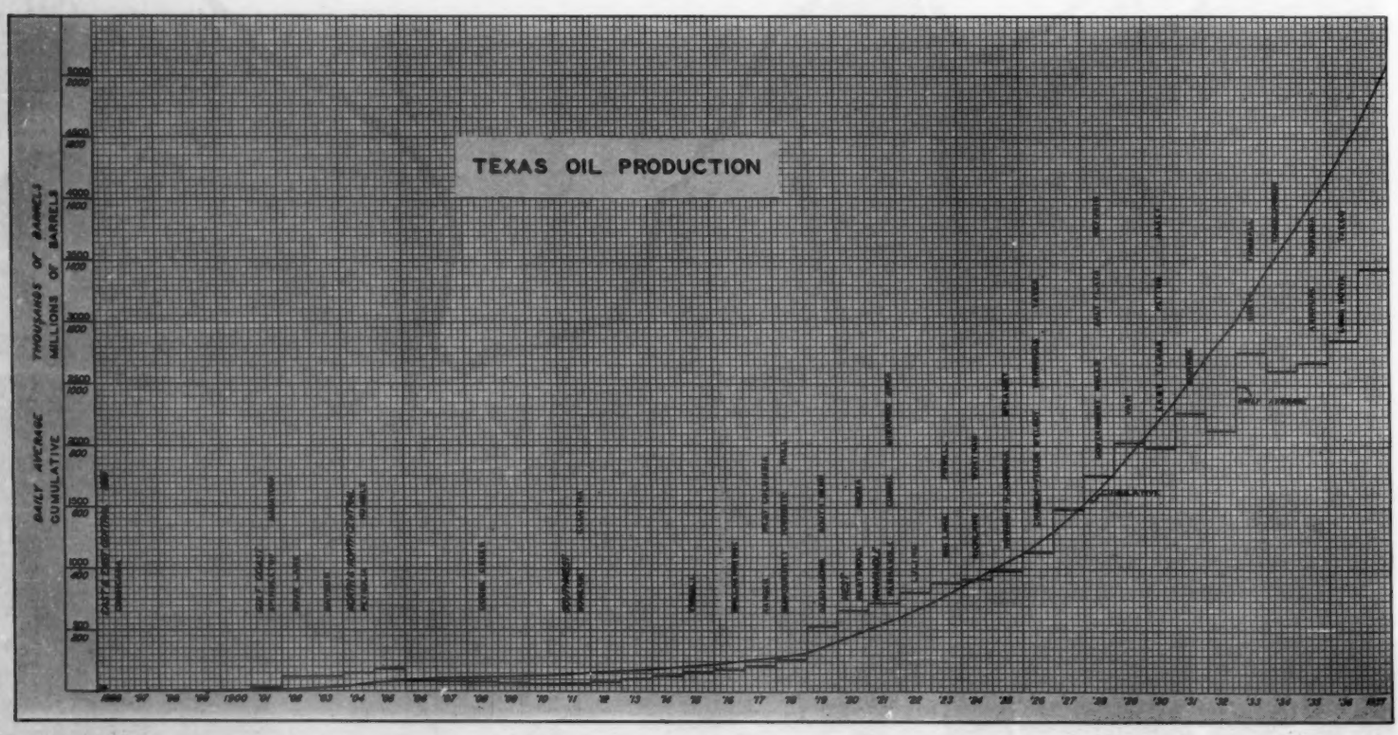
A Twentieth century gas well

and the government in a stringent proration of production, maintaining it in conformity with consumer demand and thereby eliminating waste, whether incidental to above-ground storage or resulting from undue dissipation of reservoir energy.

The oil and gas produced in Texas is secured from strata of several geologic ages at depths ranging from seepages at the surface to below 10,000 feet. No other region in the world produces oil and gas from granite wash, altered igneous rocks, salt dome caprock, and sandstones, limestones, chalk, and dolomite of varying geologic age. In no other state or nation are there oil fields associated with salt domes, igneous intrusives, major and minor folding and faulting, sand lensing, and depositional unconformities.

The Indians who frequented the hills and plains of present Texas long prior to the advent of the first explorers were familiar with the phenomenon of oil seepages and strange sour waters. They journeyed from far and wide to heal battle wounds and skin diseases at such places as Sour Lake, Damon Mound, and Nacogdoches. The early settlers also appreciated readily the therapeutic value of these waters and the oil scum that collected on their surface. They used it not only as an insecticide and external ointment for man and beast but also as a lubricant for wagon axles and as a means of softening and waterproofing leather.

Authentic information as to the number and location of seepages of oil and gas known to the hardy pioneers of Texas is difficult to secure. It is known, howeved, that Sour Lake was referred to in publications prior to 1850 and that Nacogdoches was a well frequented point on the Old Spanish Trail. It is also a matter of record that



Trend in the production of oil in Texas showing influence of new discoveries since 1896

Records

prior to 1900 the existence of oil, gas, and allied hydrocarbons had been recorded in at least 45 counties scattered over all of the present major producing districts with the exception of the Panhandle.

Although attempts were made to secure oil by drilling, boring, and digging over widely scattered areas prior to 1885, they were not attended with any appreciable degree of success, other than one well at Nacogdoches. Gas, however, had been secured near Graham in Young County in 1873 and in substantial quantities in southwestern Washington County in 1879. Some little development was carried on in this latter area from 1879 to 1883 and during 1888 and 1889.

A Texas pioneer gas well now abandoned

It was not until the period from 1886 to 1890 that the producing and marketing of oil actually began in Texas. During these years development was carried on at Oil Spring in Nacogdoches County, and that field was the first one developed in the state, although some production was secured from a well drilled for water on the Dulnig ranch seven miles southeast of San Antonio. The production from the Dulnig ranch was the first to be reported in statistical summaries in 1889, but data secured from old records and corroborating oral information indicate that several thousand barrels of oil were produced in the Nacogdoches field between 1887 and 1890. It is indeed unfortunate that no accurate records were kept as to the total production secured there in that period. This is particularly true since the first intensive drilling in the state took place in that field, as did also the construction of the first oil pipe line and the first steel storage tank for oil in Texas.

It is interesting to note that while production on the Dulnig ranch was secured accidentally in drilling for water and the production at Nacogdoches was a result of exploration for oil, both occurred in 1886. Prior to that time oil and gas had both been encountered in many wells drilled, or bored, for water in several sections of the state, but no development had ensued.

The next discovery was in the fall of 1890 on the ranch of Colonel William L. Prather near Waco in McLennan County, where a well being drilled for water encountered a substantial amount of oil at a depth of 265 feet. This oil, unlike that from Nacogdoches and the Dulnig ranch, furnished an excellent illuminating oil. No particular or immediate attention was paid to this discovery.

Texas continued to be an area of no importance from the standpoint of oil production until after its discovery at Corsicana in 1895. Here, again, knowledge of the existence of oil resulted accidentally. A well being bored for water in that city in 1894 encountered oil at a depth of 1,027 feet, and considerable difficulty, including the loss of the rig by fire, followed before it was successfully cased off and the test completed as an artesian water well at a depth of 2,470 feet. Oil continued to come up on the outside of the casing, and a company was formed to test the productive possibilites of the area. A test was put down 200 feet south of the artesian well and resulted in an oil well producing 2½ bbls. per day. A subsequent test, completed in May, 1896, produced 22 bbls. per day and furnished the incentive for additional development; and an effort was made to interest eastern capital. It appeared to be useless, however, until the late J. S. Cullinan visited the area and was convinced of its possibilities. He and his associates began active operations for the production of oil and constructed pipe line facilities and a refinery. Texas had now entered the list of states engaged in the various branches of the oil industry.

TOTAL PRODUCTION OF OIL IN TEXAS[1]

(In thousands of barrels)

Year—	East and East Central	Gulf Coast	North	Panhandle	South west	West	Texas total	Cumulative	Daily average
1896	1	.....	.....	.....	.....	.....	1	1	.002
1897	66	.....	.....	.....	.....	.....	66	67	.1
1898	546	.....	.....	.....	.....	.....	546	613	1.4
1899	669	.....	.....	.....	.....	.....	669	1,282	1.8
1900	836	.....	.....	.....	.....	.....	836	2,118	2.2
1901	801	3,593	.....	.....	.....	.....	4,394	6,512	12.0
1902	618	17,466	.....	.....	.....	.....	18,084	24,596	49.5
1903	502	17,454	.....	.....	.....	.....	17,956	42,552	49.1
1904	504	21,672	65	.....	.....	.....	22,241	64,793	60.7
1905	444	27,616	76	.....	.....	.....	28,136	92,929	77.0
1906	1,006	11,450	112	.....	.....	.....	12,568	105,497	34.4
1907	826	11,410	87	.....	.....	.....	12,323	117,820	33.7
1908	610	10,483	113	.....	.....	.....	11,206	129,026	30.6
1909	564	8,853	117	.....	.....	.....	9,534	138,560	26.1
1910	839	7,930	130	.....	.....	.....	8,899	147,459	24.3
1911	1,179	7,275	1,072	.....	.....	.....	9,526	156,985	26.0
1912	847	6,460	4,428	.....	.....	.....	11,735	168,720	32.0
1913	705	5,825	8,480	.....	.....	.....	15,010	183,730	41.1
1914	597	10,617	8,854	.....	.....	.....	20,068	203,798	54.9
1915	504	17,469	6,357	.....	613	.....	24,943	228,741	68.3
1916	426	18,342	8,444	.....	433	.....	27,645	256,386	75.5
1917	387	21,513	10,336	.....	177	.....	32,413	288,799	88.8
1918	361	21,470	16,782	.....	137	.....	38,750	327,549	106.1
1919	329	21,057	57,846	.....	134	.....	79,366	406,915	217.4
1920	348	25,735	70,563	.....	222	.....	96,868	503,783	264.6
1921	6,185	34,441	65,164	.....	376	.....	106,166	609,949	290.8
1922	34,825	35,370	47,037	.....	1,442	10	118,684	728,633	325.1
1923	50,865	30,821	43,896	.....	5,311	130	131,023	859,656	358.9
1924	49,331	26,082	42,487	272	14,880	1,470	134,522	994,178	367.5
1925	42,411	29,868	46,013	1,132	15,513	9,711	144,648	1,138,826	396.2
1926	20,530	41,135	49,932	25,551	15,010	14,758	166,916	1,305,742	457.3
1927	12,432	46,858	54,806	40,253	11,502	51,538	217,389	1,523,131	595.5
1928	8,684	39,483	49,459	25,286	10,868	123,540	257,320	1,780,451	703.0
1929	7,334	47,542	52,046	30,632	25,994	133,328	256,876	2,077,327	813.3
1930	13,193	49,540	44,301	31,777	42,916	108,730	290,457	2,367,784	195.7
1931	129,047	38,577	29,811	21,851	34,627	78,524	332,437	2,700,221	910.7
1932	141,343	37,912	26,475	18,263	25,150	63,335	312,478	3,012,699	853.7
1933	224,436	56,719	26,293	16,673	23,144	55,344	402,609	3,415,308	1,103.0
1934	198,978	53,595	31,558	20,280	26,833	50,272	381,516	3,796,824	1,045.2
1935	194,625	54,318	31,098	21,369	35,839	55,417	392,666	4,189,490	1,075.7
1936	181,672	63,002	34,928	22,410	56,269	60,504	418,785	4,608,275	1,144.2
1937	211,209	73,583	38,439	28,105	76,385	75,243	502,964	5,111,239	1,377.9
Total	1,541,615	1,052,536	907,605	303,854	423,775	881,854	5,111,239		

[1]Compiled from data of U. S. Bureau of Mines, 1889-1935, inclusive, and from data of Railroad Commission of Texas, 1936 and 1937.
Total reported production over state, 1889-1895, inclusive, was 361 bbls.

During these early years of exploration and minor development there had been sporadic attempts to secure commercial production of oil in the vicinity of Sour Lake, Saratoga, and Beaumont. Although a small amount of production had been secured at Sour Lake, such efforts had been more or less disastrous to their financial backers. The most consistent and determined efforts in Southeast Texas had been those of Patillo Higgins in the vicinty of Big Hill, some 3 miles south of Beaumont. Convinced of the possibilies for production in the immediate vicinity of the mound, he had been instrumental in the drilling of test wells there as early as 1893. In 1899 he and Captain A. F. Lucas entered into an agreement, and a test well was drilled to a depth of 575 feet. This test encountered showings of oil and gas before being abandoned. The two prospectors were now more firmly convinced than ever that the area would prove productive, but they were confronted with financial difficulties. They succeeded, however, in securing the backing of Guffey & Galey of Pittsburgh, Pa., and a second test was commenced.

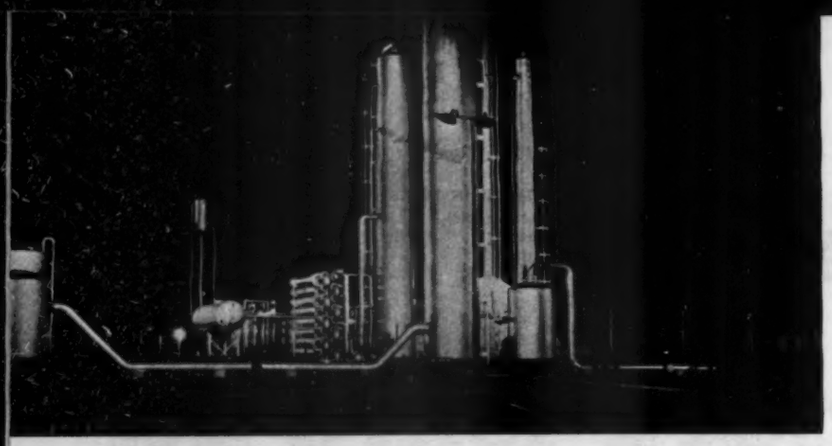
A Nineteenth century gas well

On January 10, 1901, while the test was at a depth of 1,160 feet, the well blew in. Spindletop had been discovered! It is doubtful whether any discovery in the history of the oil industry has had a comparable significance. A reservoir of tremendous proportions had been tapped at less than 1,200 feet, and every area of similar topographic character along the Gulf Coast was eagerly sought by prospectors. The capacity of the well, estimated at from 35,000 to 100,000 bbls. per day, and the force of its flow demonstrated that heavier equipment and new methods for controlling such wells would have to be devised.

A new era had dawned in the oil industry. Spindletop became a mecca for executives of eastern oil companies, independent operators, investors, and speculators. Prices previously unthought of were paid for leases on tracts of land large enough for a derrick to be erected on, and 10 acres constituted a large lease. Hundreds of companies were immediately organized and a frenzied campaign of drilling was inaugurated. Additional gushers were completed, and train loads of prospective investors were treated to the spectacle of seeing wells opened up and flowing a solid stream of oil high into the air. That practice was fraught with possible disaster through the ever-present hazard of fire, and it was immediately apparent that some action should be taken to safeguard both life and property.

The result of that practice was the first organized effort in Texas, if not in the world, to prevent unnecessary wastage of oil as well as to protect by every possible means the lives of the workmen and the property of the operators. A meeting of independent operators and representatives of oil companies and supply companies was held on August 30, 1901, and a committee was appointed to formulate proper measures of safety. This committee, of which the late George A. Hill, Sr., was chairman, adopted and published a set of rules for the safety of the field and, through its watchmen and inspectors, enforced such rules.

(Continued on Page 130)



Natural Gas, Gasoline In

Flood light, night scene at Humble Oil & Refining Co.'s new gasoline plant in the Heyser field, Calhoun and Victoria Counties.

By A. M. CROWELL and W. F. G. STEIN

Gas was first found within the state of Texas at the turn of the century. Hand in hand with the discovery of new oil fields went the opening of more and more gas fields.

Gas was originally produced in the state of Texas as a by-product of oil production, and definite figures as to its production and utilization are not obtainable for the years previous to 1906. In 1927 Texas became the leading gas-producing state of the union and has maintained its leadership. Today its output is more than twice as large as that of the next greatest producer, the state of California.

Approximately 3,000 gas wells are supplying gas from 387 reservoirs. These are scattered from the Panhandle on the north to the lowermost part of the state to the south and from the Louisiana state line on the east almost to El Paso on the west.

Although the bulk of gas production is from purely gas-producing reservoirs, large quantities of gas finds its source from the production of oil, being produced incident with oil.

The railroad commission, since June, 1935, has been engaged in the herculean task of tracing the history of each individual gas reservoir within the state. More and more data is accumulated as time goes on. With more accurate records, the day is not far off when the commission will be able to present the operators and the public with authentic historical data and indicated reserves of the majority of gas-producing reservoirs. Handicaps may be expected in many instances as the development of early fields is forever lost, but if gas shall be utilized to the very limit of its value, knowledge of field history and development must be complete.

Before 1909 most of the gas sold for domestic and industrial use in Texas was produced in Navarro County. Production of gas began in the Corsicana district about 1900. The supplies of gas discovered there had been depleted to a large extent when new fields were opened in the Mexia-Groesbeck district, in Limestone County, in 1912. Three large areas, producing gas from the Woodbine formation, were discovered in Anderson and Leon counties in 1933 and 1934. Discovery of gas at Buffalo, Camp Hill, Cayuga and Long Lake, producing gas from the same formation, increased the reserve of this area tremendously. Production from these fields has not been great as yet since pipe lines have not needed to tap this area, but it is expected that due to high formation pressure, in the future large quantities will be sent to eastern markets. Some fields in this area produce a highly volatile fluid that needs little refining to make it marketable motor fuel, and since sufficient markets for the gas have not appeared as yet, the area has had considerable attention in recycling and repressuring experiments. The fields in question extend into the East Texas district (Railroad Commission District No. 6).

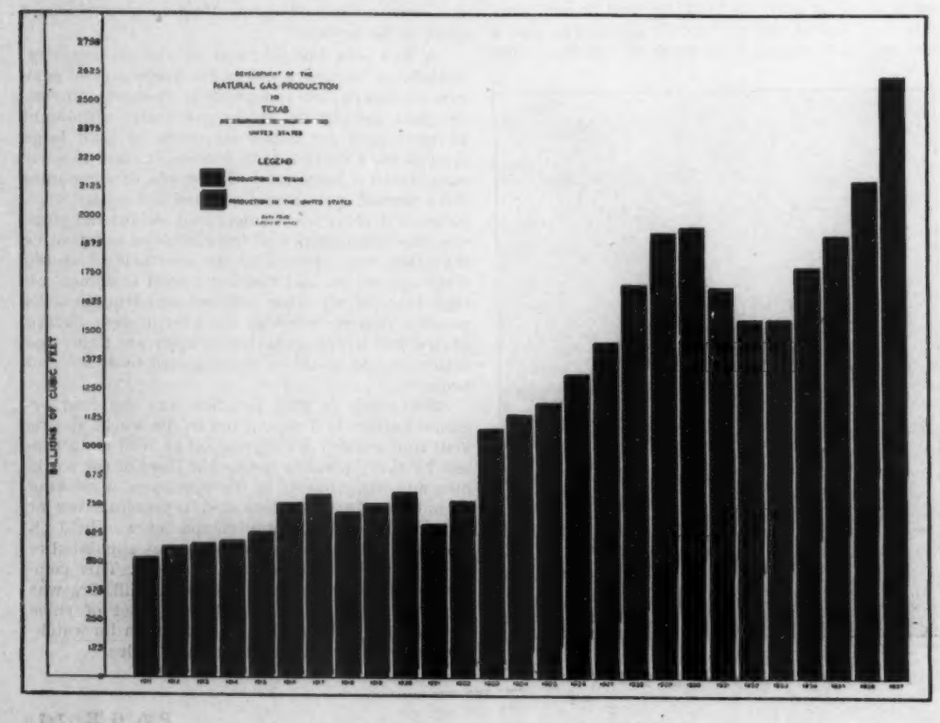
East Texas

Although the number of gas reservoirs in East Texas are few, the area has some of the most important ones. The Cayuga and Long Lake fields extend into this region. Rodessa, the tri-state field, produces vast quantities of gas, which come from a prolific oil and gas sand. Great damage is claimed in this field and the efforts of the commission to curb waste is meeting with success. The gas produced on the Texas side of the field is largely utilized by supplying many towns and cities through inter- and intrastate lines.

Among the older fields are the gas reservoirs in Panola and Harrison counties. For many years these have supplied such cities as Dallas, Fort Worth and Beaumont from the Panola (Bethany) and Waskom group. There gas-producing sands have been opened in a series of drilling campaigns, the gas levels being located above and beside each other. From depths as low as 950 feet (Nacatosh formation), through 1,900 feet (Blossom), 2,300 feet (Barlow), 2,600 feet (Roquemore), 2,800 and 2,950 feet (Florsheim), 3,200 and 3,300 feet (Tiller), drilling has penetrated to 4,700 feet (Roquemore Deep). In the neighboring Carthage field, a deep test to the 5,960-foot sand has opened an additional reservoir. Despite the fact that this area has given up many billion cubic feet of gas through many years of pipe-line operation, the figures of 1937 disclose a slight increase in output for Panola County (1936, 4,091,128,000 feet; 1937, 4,161,072,000 feet).

The total output of natural gas in this district, however, is boosted greatly by the large amount of casinghead gas produced in the East Texas field proper, which places this district second in casinghead production throughout the state. The East Texas field, although having a low gas-oil ratio, is first in number of oil wells and volume of oil produced by any field in the United States.

The richness in gasoline components and the resultant high shrinkage loss, together with the large amount of gas utilized in the operation of the field, have never allowed East Texas to be able to supply the gas demand of its oil-field cities. As a matter of fact, large amounts of gas originating in Northwest Louisiana and the Panola and Waskom fields, as well as Rodessa, have been piped into this area to supply the enormous domestic and industrial demands.



Gulf Coast Area

The Gulf Coast area adjoins East Texas (District 6) and extends from the eastern boundary of Louisiana westward and southwest along the coast of the Gulf of Mexico down to the Rio Grande.

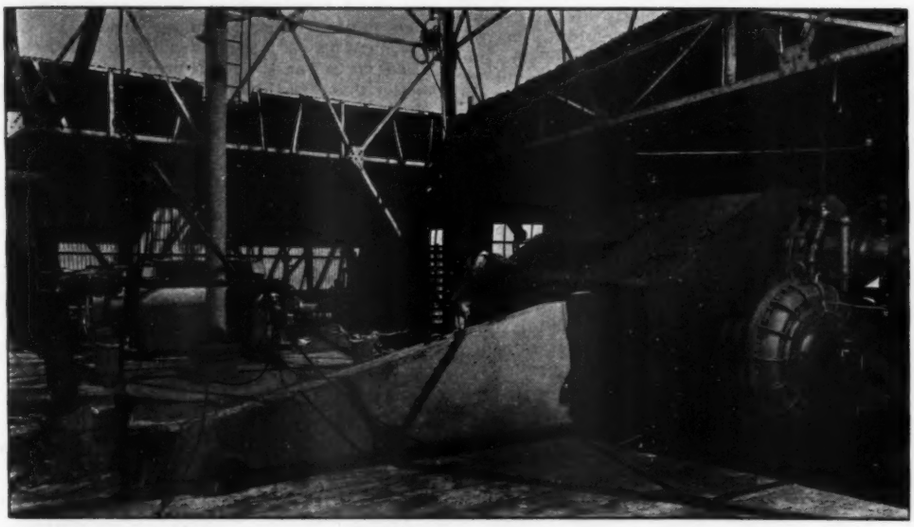
Its width varies from 80 to 100 miles inland. Important fields are Pledger, Hastings, Benavides, Cole-Bruni, Kohler, Dickinson, Gillock, Tomball, Edna, Mount Lucas, Saxet, Lopena and La Blanca, a few out of approximately 100 pools scattered through this area. Deeper drilling has disclosed immense gas reservoirs, and supplied this state with additional gas reserves, the extent of which is as yet unknown. Recent activities tend to even enlarge upon the prospects of gas supply for many years to come.

Pressures and potentials of heretofore unknown high figures make some of these fields a source of worry to operators and to the engineering department of the commission alike. Blowouts and cratering have again and again presented problems of serious interest to the industry and have caused more concern than ever before encountered in the history of drilling and production.

West Central Texas

The first evidence of gas in West Central Texas was found in core holes drilled in Palo Pinto County by the Texas Pacific Coal & Oil Co., while pros-

Carbon Black and Natural Gas Industries in State of Texas



Derrick floor of drilling barge in Galveston Bay, showing large drawworks used. Considerable gas usually accompanies the oil from such deep wells

pecting for coal, before wells were drilled. Commercial quantities of gas were first discovered in the Moran area of southeastern Shackelford County by the Texas Co. in 1912. In both of these areas the gas was found in Upper Strawn sandstone. The earliest recorded deep drilling in the area was a well in the town of Thurber, northwestern Erath County, which was drilled for water by the Texas Pacific Coal & Oil Co. in 1899. This well encountered the Marble Falls limestone slightly below 3,000 feet. Deep gas from this section was not discovered until the great wave of development which followed the discovery of the Ranger oil pool in October, 1917. During this wild and spectacular boom, only oil was sought because gas was considered a nuisance. Billions of cubic feet of gas were wasted by permitting large gas wells to blow wide open in the hope that they would blow into oil or in order that drilling could penetrate the greater depths. As a consequence, many excellent gas wells were lost forever in the mad search for oil. Both oil and gas were lost due to trappage by water coning and channeling. No apparent effort was made to conserve or develop gas until the entrance of gas pipe lines into the Ranger area in 1923.

This district comprised the first area opened to the young carbon-black industry of Texas. For several years it maintained a monopoly in the supply of this product in Texas. Depths of gas wells vary considerably and gas is distributed widely, geographically speaking. Production of dry gas in this area now ranks about seventh, however.

West Texas

Large gas reserves have been proved in West Texas and gas development here can be said to be in its infancy. All indications are that this area will comprise a majority of the low-pressure reserves. The great distance from the centers of population will retard its importance in the gas industry, however. Very little gas is withdrawn for light and fuel purposes and only the oil fields located in the extreme western portion of the area utilize gas in larger quantities. The construction of four large gasoline plants and two carbon black plants in Winkler and Ward counties will greatly contribute to the conversion of gas into marketable products, where before quantities of casinghead gas have been allowed to go unutilized and have been of very little value, other than as a lifting agent for oil.

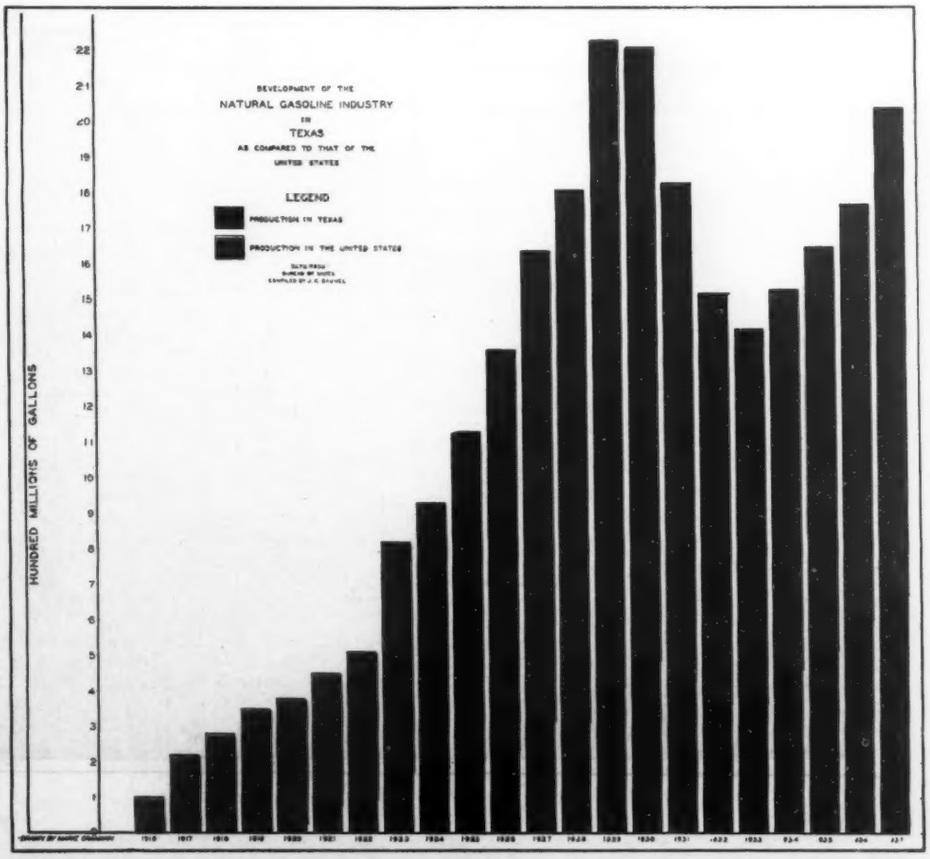
Estes, Goldsmith, Hendricks and Ward are the outstanding dry gas producing fields.

North Texas

The Foard field has been the largest producer in this area and in itself surpasses all other gas fields in this area in volume produced. The potential of North Texas is the smallest of all areas considered. Its production of dry natural gas, as well as casinghead gas, has increased over the past few years. The opening of the recent K.M.A. field, which is extending in all directions and is now being supplied with gas from the Panhandle, will provide an additional boost in the total gas produced in this area. As this article is written, additional construction of gasoline plants is on its way and gas production will follow a rising trend.

The Panhandle

Of all gas fields discovered in the world, the Texas Panhandle occupies a singular position. When gas was first discovered in northern Potter County in December 1918, its significance was not felt. The constant search for oil, not for gas, caused a scattered drilling program until in 1925 oil was found and major oil pools were developed during the years 1926 and 1927. The Panhandle "boom" was to disclose and open a gas field which surpassed anything known at that time. Today it still is the largest single reservoir known, covering ap-



proximately 2,380 square miles and extending over more than seven counties. Adjacent to the gas, an oil belt of approximately 90 miles length, which is intimately connected in many points, places this field next to the East Texas oil field in oil production and surpasses it in the amount of casinghead produced. Construction of major pipe lines around 1927 caused it to become the main factor in placing Texas in first place among the nation's gas-producing states. Lines from the Panhandle gas field not only supply Texas cities, but carry gas also over long distances to consumers in South Dakota, Minnesota, Illinois and other middle western states.

Its production reaches 2,000,000,000 feet daily, and during the time of unrestricted gas production, the tremendous volume of 1,000,000,000 feet of gas was blown to the air. The approximate volume carried from this field in 1937 through pipe lines into various parts of Texas and other states amounted to 200,000,000,000 feet, or more than 15 per cent of all natural gas consumed in the United States. There is no wastage of dry natural gas in the Panhandle today.

General Natural Gas Utilization

In a breakdown of gas we consider three kinds. First, "sweet dry gas," or natural gas produced from strictly gas wells falling under the statutory definition of sweet gas in that its hydrogen sulfide and mercaptan content is lower than 1.5 grains per 100 feet. State law makes it compulsory to use this kind of gas for light and fuel purposes only. This gas constitutes the main bulk of gas produced for light and fuel purposes. However, it is being supplemented more and more with casinghead gas since the benefits of ratable take and conservation make it imperative for many operators to rely on this gas to supplement their fuel and light requirement.

The second group is "sour dry gas," or natural gas produced from gas wells having a hydrogen sulfide and/or mercaptan content exceeding more than the legal 1.5-grain limit for fuel and light gas. Sour dry gas at the present is produced largely in the Texas Panhandle and also in West Texas in large quantities. Small quantities are produced in the Chittim field in South Central Texas (District No. 1). Gas of this kind can be used for light and fuel purposes only, if the hydrogen sulfide and/or mercaptan content is sufficiently lowered to meet pipe-line regulations, either by purification or commingling with sweet gas.

Gas purification for the elimination of undesirable sulfur compounds is expected to become one of the major problems of the gas industry. Its main value, however, is to the carbon-black industry, for which it constitutes the bulk of raw material.

Up to April 1936, before the waste provisions of House Bill 266 became completely effective, considerable waste of dry natural gas through the state was present. The seasonal decline in dry gas production in 1937, from January to June, amounted to only 4,000,000,000 feet. The decline for the corresponding period in 1936 amounted to 25,000,000,000 feet. Casinghead gas, which is gas produced incident to the production of oil, in turn was reported to have risen from 21,170,000,000 feet per month in January 1930 to 31,588,000,000 feet in December, 1937.

This brings us to the third group, casinghead gas, and its importance. Whereas casinghead gas is not subjected to limited uses by statute and can be blown to the air, it is now supplying, due to the efforts of the commission, a fair share of pipe-line gas and gas for carbon-black manufacture. Also, it supplies a large amount used on leases and in oil-field camps. The amount of gas repressured and reintroduced both to the horizon, which originally contained it, and to oil-producing horizons as a lifting agent is constantly increasing.

The last monthly gas report of the commission shows only 253,000,000 feet of gas daily going to the air, which represents 8.41 per cent of the total volume as compared with a casinghead overall production of 975,000,000 feet daily, or 31.7 per cent of all gas produced in Texas.

The development of casinghead gas conservation can be traced back to the enactment of several laws passed by the legislature of Texas.

Among their diverse provisions, the importance of the conservation of gas energy in the production of oil is stressed and have been the basis for present sound conservation practices.

Further progress has been made due to oil operators' realization of the function of natural gas in the production of oil. Elimination of waste in the gas areas of oil fields has been an incentive to the reduction of gas-oil ratios in the oil areas.

It is likewise necessary to make experiments to ascertain whether or not high gas-oil ratio wells should be classified as gas wells or oil wells. The commission is giving increasing attention to technical problems dealing with mixtures of gas and oil under high pressure and to production practices in combination oil and gas fields.

There may still be preventable waste of casinghead gas in Texas, but gas operations now appear better than ever before in the history oil and gas production. Petroleum and its companion, gas, are now recognized as a resource irretrievably lost through consumption.

General Statistics

A statistical survey of gas production must start with the year 1906, when the first accurate records of the U. S. Bureau of Mines became obtainable.

Texas produced 1,039,000,000 feet of gas during the year 1906 from less than 50 gas wells, and its production was less than one forty-first of the United States production.

A short survey gives us the average wells drilled per annum based on five-year periods, compared with the average gas production.

TABLE 1—AVERAGE OF GAS WELLS DRILLED AND ANNUAL PRODUCTION

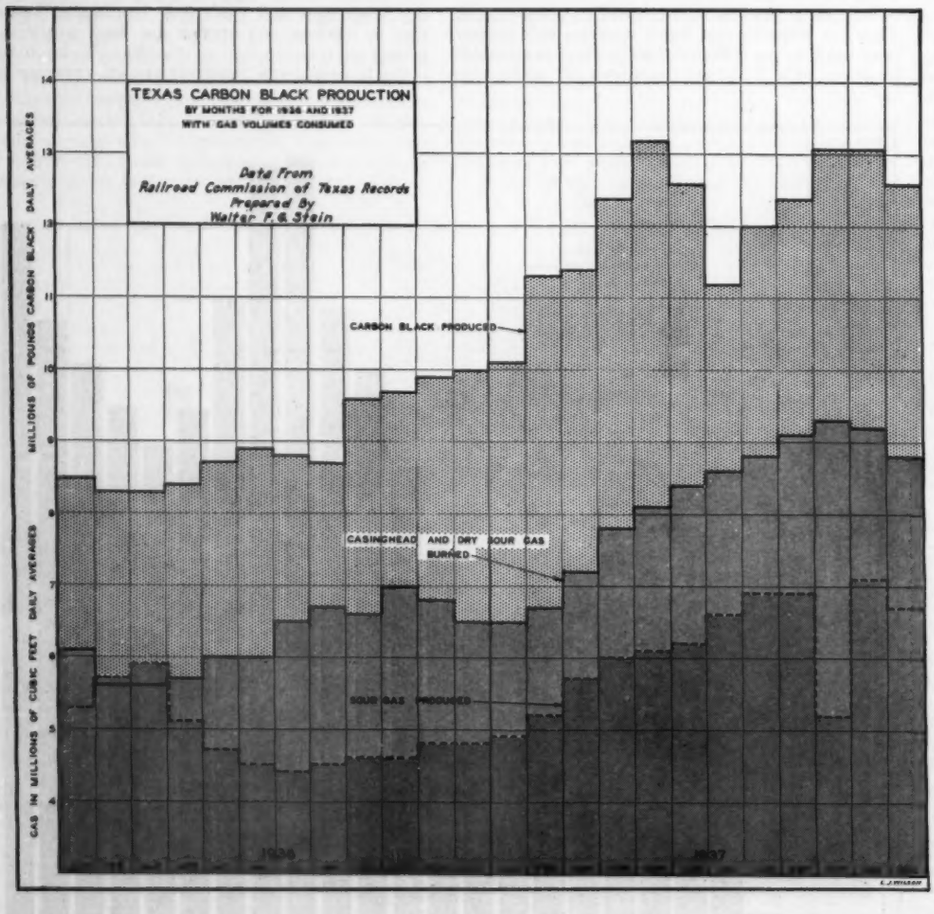
Years averaged—	Number of wells (av. per annum)	Gas production (cu. ft.)
1906-1910	11	3,311,000,000
1911-1915	17	10,378,000,000
1916-1920	116	21,614,000,000
1921-1925	114	81,821,000,000
1926-1930	461	342,851,000,000
1931-1935	221	528,489,000,000
1936-1937	406	813,156,000,000

This table shows a decline of gas wells drilled during the national depression era, but shows the inclined trend of drilling activities in the past two years. Production as an overall picture shows a continuous rise in volume. For a more detailed account, see chart on page 78, which does show a small drop in production of natural gas following 1930 and a consecutive increase in 1934.

Expressing the per cent Texas shares in the United States production shows the importance of Texas' production in our national life.

TABLE 2—PER CENT TEXAS SHARES OF UNITED STATES TOTAL NATURAL GAS PRODUCTION

1911	1.07%	1920	4.64%	1929	24.25%
1912	1.33	1921	6.72	1930	26.65
1913	2.09	1922	6.29	1931	27.55
1914	2.27	1923	7.40	1932	29.35
1915	2.12	1924	9.39	1933	30.58
1916	2.09	1925	11.35	1934	34.05
1917	2.14	1926	13.36	1935	33.52
1918	1.86	1927	17.58	1936	33.92
1919	3.31	1928	19.26	1937	34.45

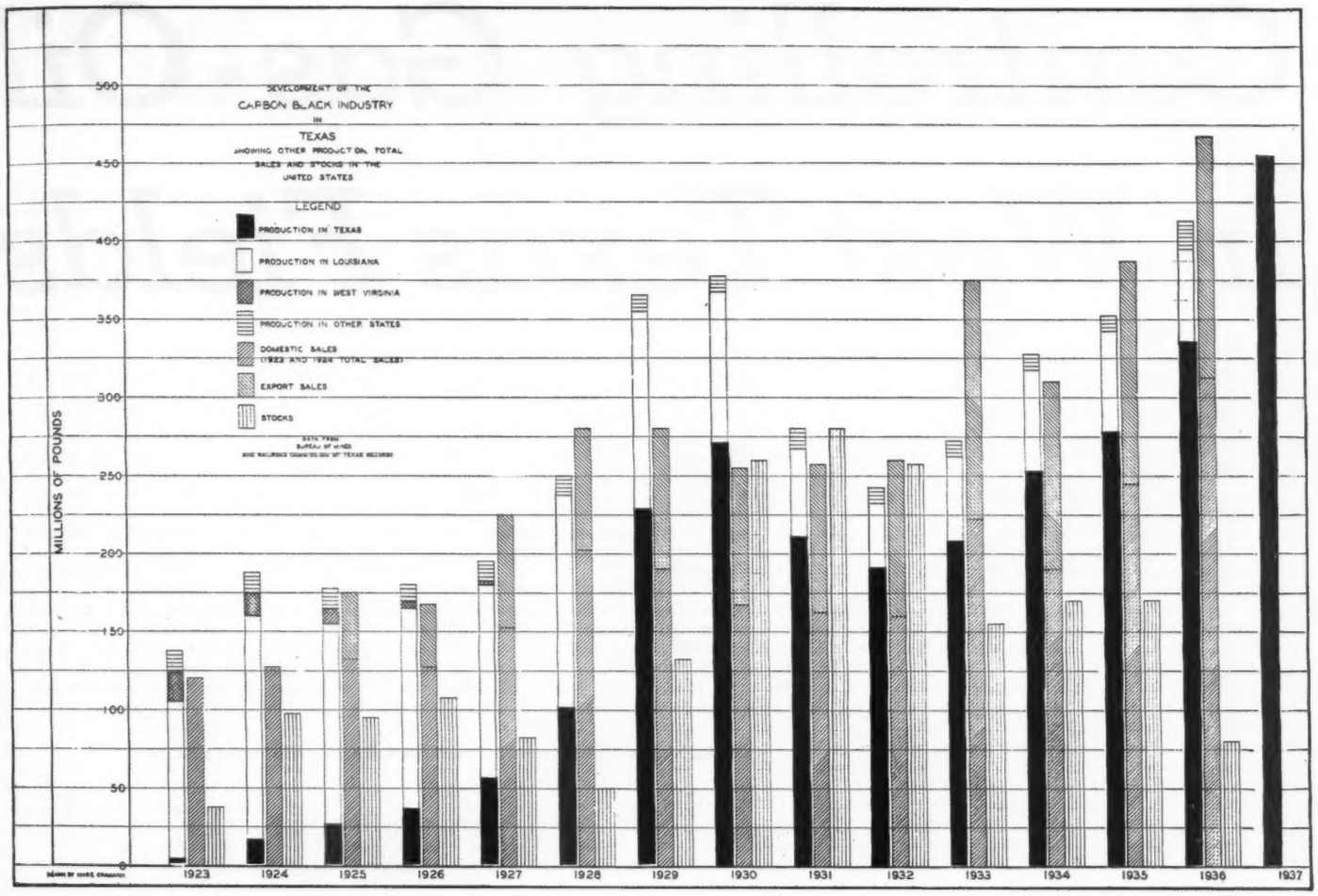

TEXAS CARBON BLACK PRODUCTION
BY MONTHS FOR 1936 AND 1937
WITH GAS VOLUMES CONSUMED
Data From
Railroad Commission of Texas Records
Prepared By
Walter F. G. Stein
MILLIONS OF POUNDS CARBON BLACK DAILY AVERAGES
GAS IN MILLIONS OF CUBIC FEET DAILY AVERAGES
CARBON BLACK PRODUCED
CASINGHEAD AND DRY SOUR GAS BURNED
SOUR GAS PRODUCED
1936
1937

Pipe-Line Gas Consumption

The production and consumption of gas in Texas was dependent of course on the increased use of gas for domestic and industrial fuel, not only in this state, but in other states. The weaving of a closer net of intra- and interstate gas pipe lines has brought gas into many remote corners of the nation, and has brought greater prosperity and savings to producer and consumer.

A decline in the price of gas at the wellhead was consequential to the increased volume of gas produced. The price level, as it existed in 1922, 8 cents per 1,000 feet, may never be reached again. The lower purchasing price afforded the possibilities of transporting gas over long distances at reasonable price, without which gas could never have been able to compete with the original traditional fuels, wood and coal, in the densely populated districts.

The history of the relative values and volumes



of gas consumed in Texas is shown in Tables 3 and 4.

Consumers in the nation have reached 10 times their original number in a span of 30 years with a greater ratio of gas consumer per household or unit. In Texas this increase has been tremendous. In 1906 only 703 domestic consumers were using natural gas. Five hundred and ninety-eight thousand households and units constitute the vast army of gas consumers today.

Texas gas pipe lines were planned with an eye on the future, but many systems have had to increase their throughput capacity again and again. Many systems are operating at maximum capacity. More than 100 systems, interurban, urban and rural, extend their steel arteries, varying in size from 2-inch to 2-foot diameter, over the nation's terrain.

Interstate pipe-line systems carry Texas gas into 15 other states and into the Republic of Mexico. The state of Illinois is the largest customer, followed in sequence of size of volume by Kansas, Colorado, Iowa, Indiana, Missouri, Oklahoma, Nebraska, the Republic of Mexico, Minnesota, Louisiana, Michigan, Ohio, New Mexico, South Dakota and Wyoming. The companies whose lines furnish gas to out-of-state points are listed in Table 5.

Gas for Carbon-Black Production

The bulk of gas consumption for industrial purposes is largely divided. Field consumption of gas as a source of power in and around oil fields, petroleum refineries, electric power, portland cement, and various other uses throughout the United States is of great magnitude. Carbon-black manufacture requires approximately 16 per cent of the total consumption of gas for industrial purposes in the United States. In the state of Texas its percentual share is more than 30 per cent of the total. This industry, over a period of years, has accounted for many trillion feet of gas. Since Texas is the main exponent, it will continue to be the largest single customer among the manufacturers in this state.

A comparison between the various types of gas produced within the state and the disposition of this gas indicates a certain relationship in the trend of conservation.

It can be seen from this table that the amount of gas blown to the air has decreased considerably. A comparison of the production for the two years of 1936 and 1937 and the distribution of gas as shown on Tables 7 and 8 give the respective figures by months.

From Tables 7 and 8, the dry sweet gas production in January, 1936, has not been equaled and a steady decline of dry gas production is an index to efficient utilization and true conservation. The (majority of) dry gas production in the Panhandle area in 1936 amounted to 1,695,702,000 feet daily, with approximately 500,000,000 feet being blown to the air.

The total gas vented to the air in January 1936 amounted to 20,604,000,000 feet, and consisted of large quantities of dry sweet and sour gas. This figure has declined to a low of 5,261,000,000 feet a day, all of casinghead gas equivalent. The increased number of casinghead wells connected to gasoline plants in December 1937 increased the total gas blown to the air, since casinghead, after it has been processed for gasoline extraction, can be wasted. This amount represents only about 20 per cent of the total casinghead gas reported and 7.94 per cent of the total gas produced. In January 1936 the per-

(Continued on Page 197)

TABLE 3—GROWTH OF NATURAL GAS CONSUMPTION IN TEXAS—BY TYPES OF USE

Year—	Field	Industrial Consumption (Billions of cubic feet) Carbon black	Petroleum refineries	Pub. util. elec. power	Portland cement	Other indus.	Total
1927	103	35	32	24	(*)	54	249
1936	204	228	28	36	(*)	57	533

*Included with other industrial consumption.

Source: American Petroleum Institute; Mineral Yearbook; Arnold and Kemnitzer's Petroleum in the United States and Possessions. Compiled by Jack Baumel.

TABLE 4—GROWTH OF NATURAL GAS CONSUMPTION IN TEXAS

Grand Total of All Uses

(Billions of cubic feet)

1906	1.0	1922	60.0
1907	1.28	1923	83.0
1908	1.75	1924	108.0
1909	4.365	1925	142.0
1910	8.110	1926	187.0
1911	6.0	1927	270.0
1912	8.0	1928	319.0
1913	12.0	1929	466.0
1914	13.0	1930	526.0
1915	13.0	1931	448.0
1916	16.0	1932	415.0
1917	18.0	1933	412.0
1918	20.0	1934	501.0
1919	38.0	1935	526.0
1920	50.0	1936	577.0
1921	51.0		

Source: American Petroleum Institute; Mineral Yearbook; Arnold and Kemnitzer's Petroleum in the United States and Possessions.
Compiled by Jack Baumel.

TABLE 5—PIPE LINES TRANSPORTING TEXAS GAS TO OTHER STATES AND COUNTRIES

(Alphabetically)

Arkansas Louisiana Gas Company
Brazos River Gas Company
Canadian River Gas Company
Cities Service Gas Company
Consolidated Gas Utilities Corporation
Lone Star Gas Company
Northern Natural Gas Company
Northern Texas Utilities Company
Panhandle Eastern Pipeline Company
Panhandle Power & Light Company
Public Service Corporation of Texas
Joaquin Gas Company
Shasta Corporation
Texoma Natural Gas Company
United Gas Pipeline Company
West Texas Gas Company
Wheeler Gas Company

Controlling Gas-Oil in West Texas Fields

The most important operating problem before producers in the Permian Basin of West Texas perhaps is proper control of gas-oil ratios. Daily allowables, flowing life of wells, and ultimate recovery are directly affected by excessive or inefficient producing ratios of gas to oil.

The Texas Railroad Commission added to the importance of the subject by public hearings and orders, the most recent of which requires that quarterly gas-oil ratio surveys be made by its engineering department on all producing fields in West Texas. In opening the first ratio hearing in Midland on February 7, Col. E. O. Thompson forcefully indicated why the commission is and will continue to be so concerned with enforcement of efficient producing ratios.

"In this West Texas area, particularly, an efficient utilization of gas energy in the production of oil is of great significance," said Colonel Thompson. "Since gas is the primary agent moving the oil through the reservoir into the well bore where it may be recovered. The fields represented by this hearing represent about 50 per cent of the production in the vast Permian Basin, and they represent a substantial portion of the oil reserves of Texas. It is to our immediate interest to see that as great a portion of the oil contained in these reservoirs is recovered as possible, and that it is recovered by the most economical means, which is flowing."

Injection of the gas limit factor in the allocation formula of most West Texas fields definitely presents the gas-oil ratios as a function of daily allowables, payouts in investment, lifting costs, ultimate recoveries, profits, etc. As applied at the present time, however, uniform gas withdrawals are not always made, and it is thought by some that room remains for improvement. A different permissible ratio is determined for each field, depending upon the individual conditions at hand. The form of order covering gas-oil ratio limitations upon well allowables in West Texas follows:

"Any oil well producing with a gas-oil ratio in excess of *(permissible ratio)* cubic feet per barrel of oil shall be allowed to produce daily that number of cubic feet of gas allowable multiplied by ratio set for the field for the maximum daily oil allowable of any well producing within the specified ratio, providing that the resultant oil allowable for the high ratio well when calculated on a displacement basis does not exceed the allowable for such well as calculated on the basis of the producing formula prescribed."

For example, if the highest allowable in the field is, say 100 bbls. per day under the existing manner of proration, and a top gas limit factor of 3,500 feet per barrel has been prescribed, a total of 100 × 3,500, or 350,000 feet will be the gas limit for any well in the field for any one day. Assuming a high gas-oil ratio well of 10,000 feet, its allowable would be 350,000/10,000, or 35 bbls. per day. Under such conditions the plan offers strong inducement for the operator to recondition a well to produce with a more efficient ratio and receive comparable allowables with other producers in the field. The inconsistency in the order lies in the fact that even though a top ratio of 3,500 feet per barrel is ordered, much oil is produced at ratios far in excess of that amount, with the resultant damages to the reservoir.

Table 1 sets out certain fields in West Texas, their permissible ratios, actual ratios, and number of offending wells.

Clearly, the proper and easiest time to establish efficient producing ratios is during the completion period of each well. This is done best under ordinary circumstances by accurately determining the gas-oil contact, and setting the producing string of casing below that point and above the oil-bearing zones. Far greater progress has been made in the technique of completion practices conducive to efficient ratios than has been made in remedial work for the same purpose. Furthermore, operators have shown a much greater willingness to cooperate in this sort of a program than in the systematic reworking of their wells. In fact, about the only improperly completed wells today are those where the contact of free gas and oil is not properly picked, or where casing becomes stuck and cannot be landed at the desired spot when being run.

Correct completion practices, which afford efficient ratios, are better than attempts to recondition later in the well's life. The percentage of recovery that may be expected ultimately in any gas-drive field is seriously limited as a rule because the natural energy is spent long before all the available oil is moved into the well bore. Longer flowing life, higher fluid levels and easier lifting conditions after going on the pump, availability of gas for gas-lift operations if desired, uniform reservoir withdrawals without the damaging effects of gas-cap formation, etc.—all are well-established benefits offered to operators in fields where the conservation of solution and free gas is a matter of consideration from the beginning.

TABLE 1—GAS-OIL RATIO DATA FOR REPRESENTATIVE WEST TEXAS FIELDS

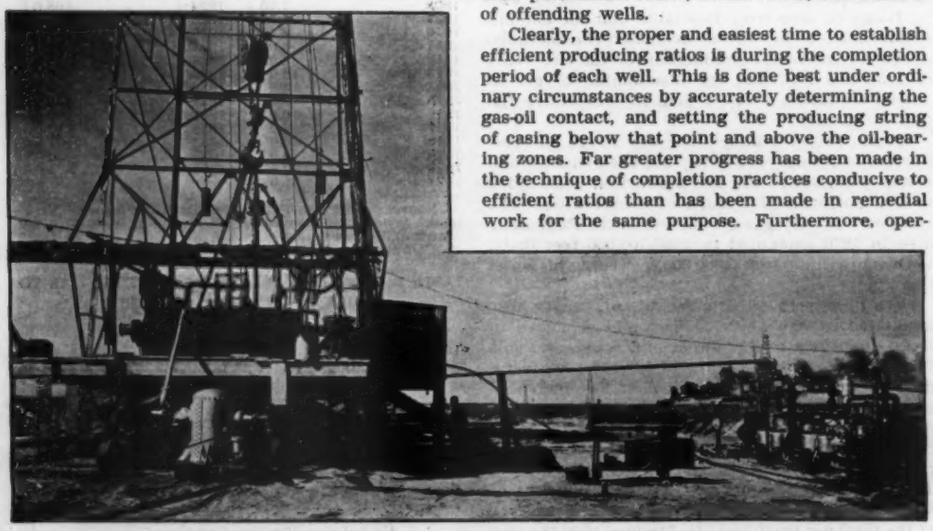
Field and county—	Daily wells	Daily barrels	Daily M.C.F.	Average gas-oil ratio	Permissible ratio for field	No. wells over ratio field	Per cent of wells reported w/ ratio in excess of set ratio
North Cowden, Ector	156	7,079	20,018	2,827	3,500	35	22.4
Estes, Ward	233	13,428	22,413	1,689	2,000	42	18.0
Goldsmith, Ector	331	60,681	145,615	2,400	5,000	21	6 3
Kermit, Winkler	728	18,721	47,107	2,516	3,500	148	20.3
Keystone, Winkler	69	6,405	43,853	6,751	8,000	9	13.0
Penwell, Ector	147	5,685	7,953	1,302	2,000		
North Ward, Ward	236	12,497	651,334	5,211	5,000	37	15 7
South Ward, Ward	589	14,219	40,211	2,827	5,000	95	16 1

An efficient ratio upon completion is often prevented because of the desire to establish high potentials. In Permian fields of New Mexico operators are not confronted with this problem, as potentials in that state are wisely not a factor in the determination of allowables. As an example, in the North Cowden field of Ector County, nitroglycerin shooting is helpful in establishing higher potentials. In consideration of the possible damage to casing when shooting, operators often set the oil string sufficiently high to avoid danger from this source, without regard to the actual gas-oil contact, and then set formation packer as a part of the regular completion procedure. The hole wall is preserved by confining the shot to the oil-bearing portion of the lime only, usually by tamping.

Some sound reasons have been presented to substantiate the claim that the ratio of gas to oil increases with the size of the bore hole made through the producing section. Where casing is already set above the gas-oil contact, it has been suggested that ratios might be reduced by reaming out only the oil-bearing portion of the hole.

The almost universal use of some drilling fluid other than mud for drilling through the producing section with rotary tools has also assisted perhaps in effecting more efficient ratios. Oil, pulverized limestone, or gas are used as circulating mediums. When the producing section is drilled with circulating mud, there is always less danger of clogging the hole face with mud opposite gas-bearing zones than oil-bearing zones, with a detrimental effect upon gas-oil ratios.

Selective well completion as so effectively prac-



Steam traps are in common use in West Texas steam drilling operations

Ratios

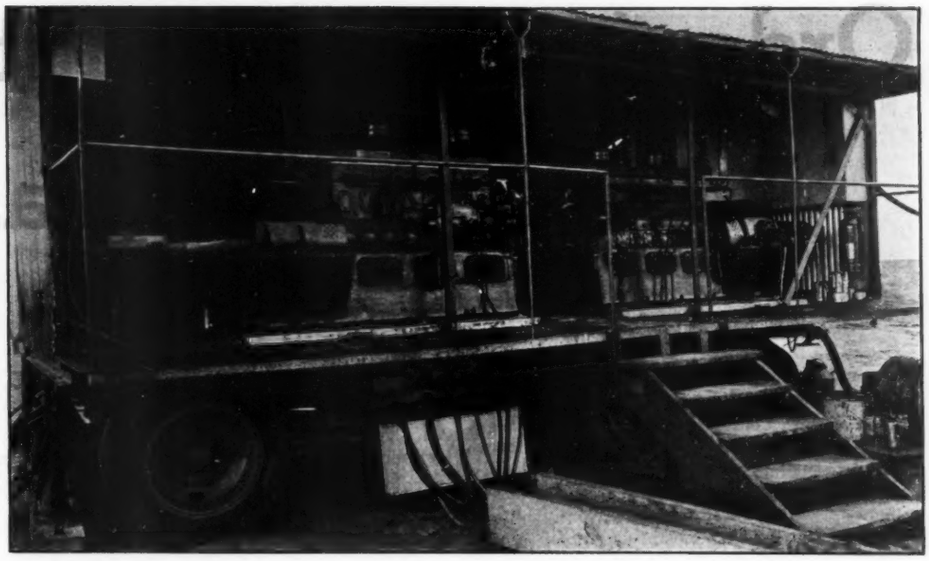
ticed in other areas has not been suitable to most West Texas fields because of the thickness of the producing section, comparative low pressures, and need for acidizing or shooting in order to establish high potentials and obtain allowables comparable with those of other producers in the field. Recent completions in the Seminole field of Gaines County, one of the high-pressure areas in the North Permian Basin, were made by the selective method. Satisfactory ratios were obtained in what otherwise might have been high gas-oil ratio wells due to the abundance of gas in upper strata. After carefully logging the hole, pipe was cemented on bottom and gun-perforated opposite desired zones of oil saturation, and only the saturation gas was produced with the oil.

Either in completion or remedial work, the most important detail is the accurate selection of the point of contact between the oil and the free gas. Drillstem tests have been of value for this purpose in some fields. The electrical temperature survey has been found highly successful in this work, and is widely used. In a recent A.P.I. paper delivered before the Mid-Continent district meeting in Amarillo on "Application of Electrical Logging Methods to West Texas Problems," W. J. Gillingham and W. B. Stewart, co-authors, had the following to say with regard to determining the base of the gas:

"Oil pays will show a cool anomaly on the temperature log. However, the cooling effect generated by the gas in solution is usually much less than that generated by free gas, and as a result it is usually easy to distinguish between the two.

"One of the most difficult and important problems in the Permian Basin is the location of the base of the gas so that casing may be set correctly. If the casing is set too low, valuable oil pay may be cased off; on the other hand, if the casing is set too high, a well with a high gas-oil ratio, or even a practically dry gas well, may result.

"Figure 1 shows examples from the Goldsmith, Fuhrman, and Sayre pools. The example from the Fuhrman pool is exceptionally interesting since the offset well to the one surveyed made over 10,000,000 feet of gas with casing set at 4,050 feet. On setting a liner to 4,205 feet the gas was eliminated and the well brought in with a low gas-oil ratio. The example in the Sayre pool, on the other hand, shows the disadvantage of setting casing before the base of the gas has been reached, a well with a high gas-oil ratio resulting.



Electric generating equipment mounted on an eight-wheel trailer, serving as an integral part of the newest type diesel-electric rig in West Texas

Drilling time also has been found helpful in selecting a hard, impervious casing-seat between the gas and the oil.

Formation packers, cement squeeze jobs, liners, or short strings are the most common types of remedial devices employed to reduce existing high ratios. Developments in the design of formation packers and the technique in setting and removing them have made them the most widely used means for correcting hole conditions. The important point in setting formation packers is to determine the contact between the gas and oil and to have sufficient well information to permit accurate selection of an impervious zone between the gas and oil where the uniformity of the hole has been maintained.

In addition to the well log itself, Schlumberger electrical surveys and a study of drilling-time records, are the two most reliable guides in picking packer spots. The electrical log will indicate impervious sections between the free gas and oil that appear to be effective packer seats. This can be further checked by the drilling-time curves, and if slow drilling was recorded through the same interval, a suitable packer point probably is selected.

In older producers, where such information is not available, satisfactory results often have been obtained by picking the packer set by the aid of correlative data from other wells which occupy a somewhat comparable structural position. The trial and error method usually is resorted to in these cases.

Care should be taken also to see that there is no vertical permeability or communication between the free gas and oil zones which are to be separated by packer in the well bore. Where such a possibility is thought to exist, fiberous materials, heavy prepared mud, cottonseed hulls, or other similar substances are placed on top of the formation packer in the annular space between the tubing and the hole wall. This type of material also has been found effective in shutting off gas where the upper formation has been fractured due to previous shooting.

A lefthand or safety joint should always be placed in the tubing string right above the packer. If the formation caves or the packer becomes stuck for any reason, tubing string can be backed off and packer fished out with the proper tools.

In reviewing the records of 84 wells in West Texas and New Mexico where formation packers have been set in what were previously high-ratio wells, it was noted that the original average ratios of these wells were 16,376 feet per barrel, and after setting packers the average ratio of all were reduced to 2,075 feet per barrel.

In certain types of more or less uniform strata, where the occurrence of free gas and oil is not divided by any preceptible zone of separation, cement squeeze jobs sometimes are relied upon with success to shut off some or all of the gas. Some believe, however, that if the oil-bearing section is at all cavernous, there is danger of some cement setting within the large void space and shutting off some oil.

Acid selectively applied to the oil-bearing portion of the producing section has materially improved producing ratios in many cases. Extreme care is taken to confine the acid charge to the lower part of the pay. The two-pump method was developed for this purpose, applying the full charge by stages. Oil is pumped down the annular space during treatment to confine the acid to the lower pay section and eliminate the possibility of acid going into the upper gas-bearing portions of the pay. In the more recently developed "floating-in" method, the casing is closed in without loading the hole. Enough acid is introduced to cover the face of the oil pay, allowed to remain for the desired reaction period, and then swabbed out. The second-stage treatment uses larger volumes of acid, which is pumped slowly into the formation at a pressure less than the peak tubing pressure observed during initial treatment.

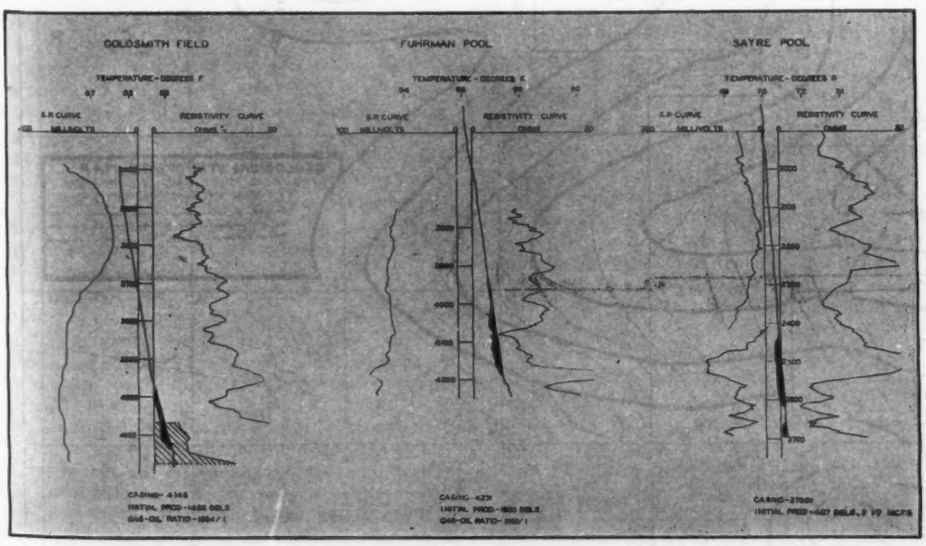


Fig. 1—Typical examples of temperature surveys made to determine gas-oil contacts

Ordovician Possibilities Revive West Central Texas District

By H. H. ADAMS
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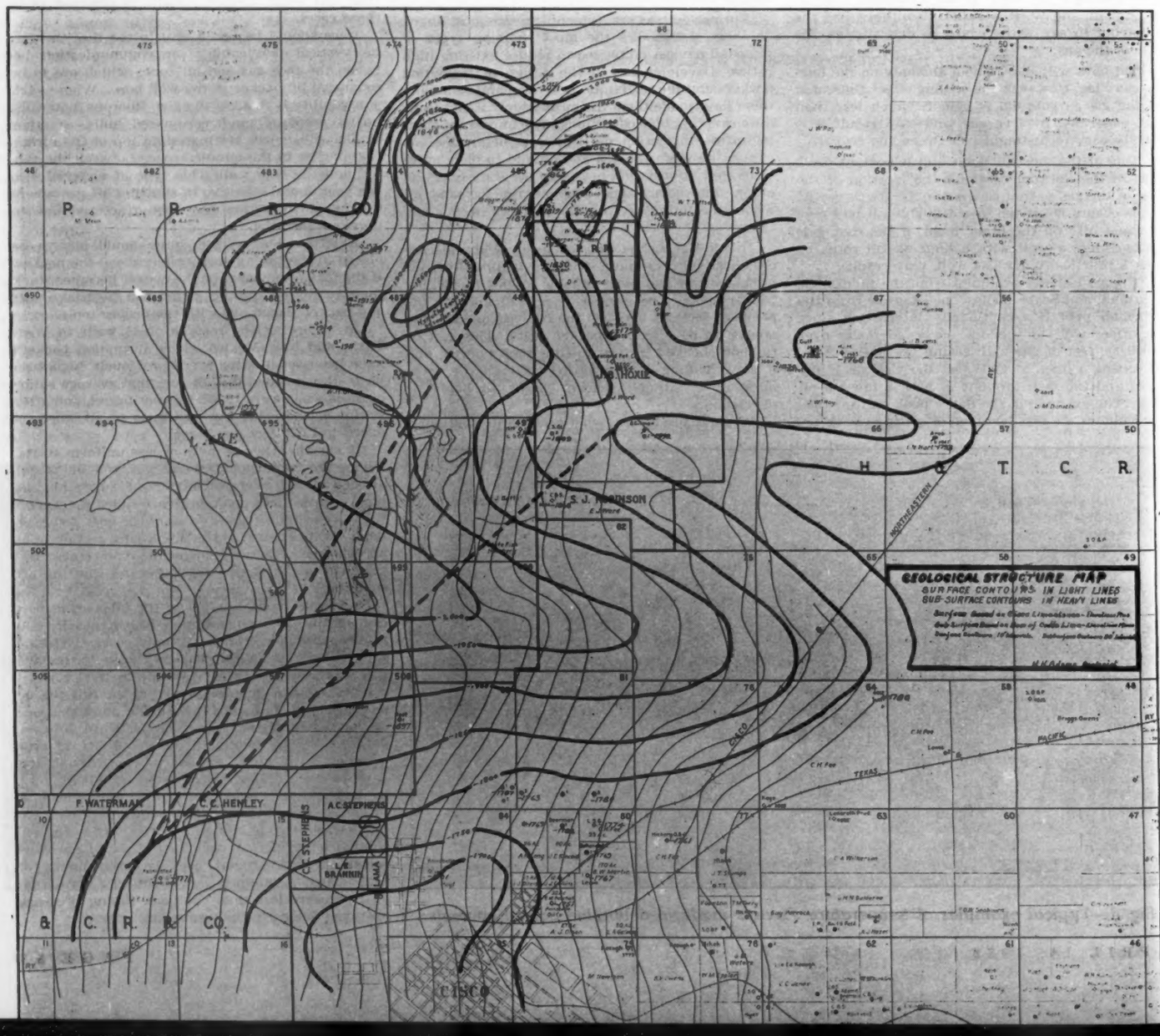
The Ellenburger (lower Ordovician) formation first produced gas in the Ranger or West Central Texas district in commercial quantities in 1919. Several other wells were later completed to that horizon which made attractive showings or good producers, the most important of which have produced over a million barrels of oil to date. Economic conditions, together with improper well completion methods used at that time, discouraged deep exploration in the district until the past year or so, but now an active deep wildcat campaign is seen in West Central Texas. This is further stimulated by the recent discovery of prolific oil production in the Cisco Lake structure of Eastland County, and the Oplin area of Callahan County.

Recognizing the possibe discovery of petroleum deposits in the Ordovician has revived interest in the Ranger and West Central Texas areas.

In this very brief and perhaps incomplete outline of the extent and productivity of the Ordovician in West Central Texas, an attempt will be made to trace roughly some of the known early wells drilled to this horizon; their relation to surface and subsurface structures as well as their relation to the known northeast-southwest trends along and across the Bend Arch; and a preliminary discussion of the Ellenburger section itself. The basis of this discourse is from observations and experiences of the writer during his 20 years acquaintance and work in the district.

A consideration of economic and operating con-

Fig. 1—Illustrating the close conformity between surface and subsurface structures in West Central Texas. The light contour lines are on surface points; dark ones on subsurface. Note the four pronounced noses to the north, as reflected by mapping on each level



ditions during and after the Ranger boom of 1919-20 is required in order to understand why so few deep Ordovician tests have been made upon the many known structures in West Central Texas since this zone was first indicated to be productive under favorable conditions in 1920.

In the first place, the deeper production in the Ellenburger did not look attractive at that time in the face of the more expensive drilling, and the abundance of oil being produced from the Ranger pay. Also, operators were alarmed at the rapid decline exhibited by the Ranger sand producers. This, of course, was due to the complete lack of any conservation or good engineering practices. Wells were flowed wide open through one or more 6-inch lead lines; no effort was made to conserve gas energy or hold a back pressure on the wells. Hence, the highly porous Ranger sand gave up its oil quickly and voided itself at a much faster rate than good operating practices would dictate today.

Revival of Interest

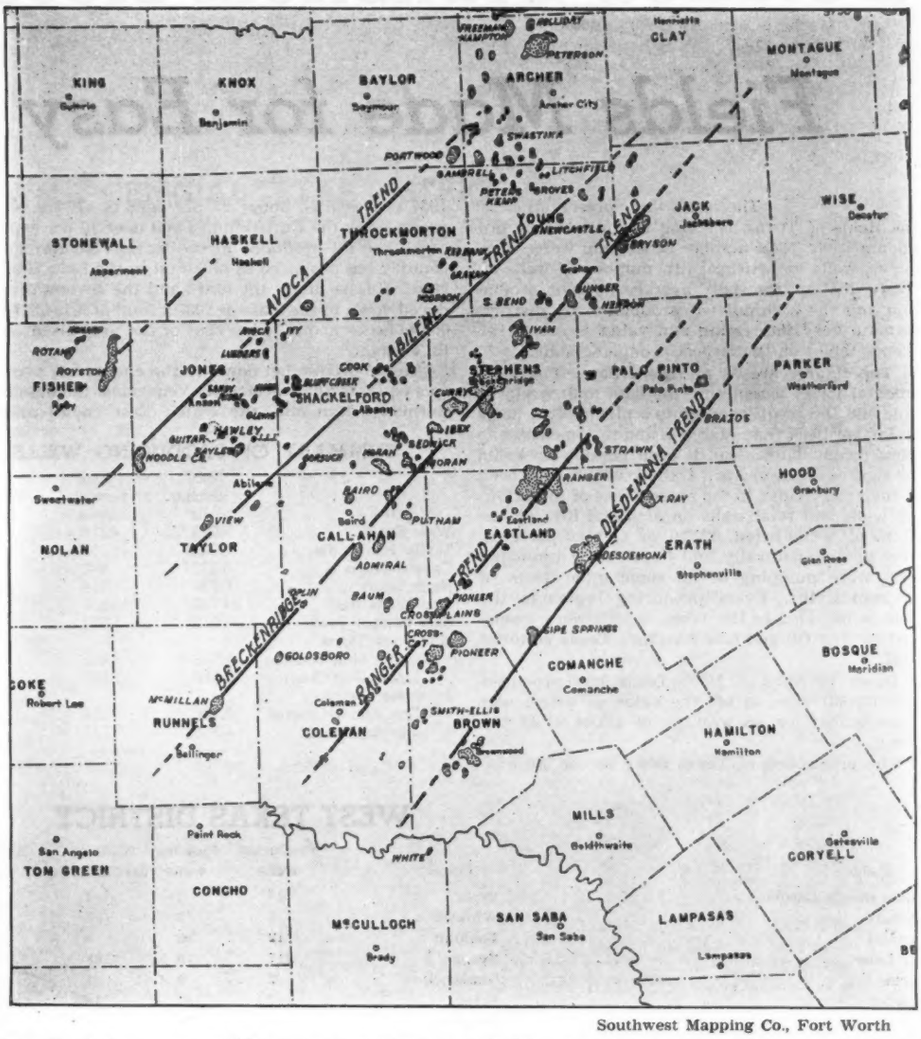
The Ordovician possibilities were discounted at that time because of this rapid decline in upper sand production. Furthermore, operators were pulled away from the Ranger district by the discovery of many of the country's largest fields which were opened in rapid succession following the Ranger boom. These included the Desdemona, the Necessity field, Breckenridge, the Wichita Falls area, Mexia, Corsicana, Conroe, Smackover, and many others up to the East Texas field. During this period the country experienced two economic depressions.

The revived interest in West Central Texas deep possibilities is due to several reasons: (1) the known high recoveries from upper levels; (2) the many known but untested structures to the deeper formations; (3) improved completion practices in limestone formations; and (4) the recent discovery of two very impressive Ellenburger fields. Irrespective of the rapid dissipation of reservoir energy, and decline in the production rate, many leases in the Ranger, Desdemona, Brewer, and other pools have produced 40,000 bbls. per acre or more, and are still making commercial quantities of oil.

An attempt will be made to establish the fact that the Ellenburger production is and will continue to follow the northeast-southwest trends along which all the oil from the formations in the Cisco, Canyon, Strawn and Bend groups has been produced for many years.

The close conformity between the Ellenburger structures, the Cisco-Canyon-Strawn-Bend structures, and visible structures, as worked by surface geology through this district, is strongly indicated. Figure 1 offers an excellent example of the uniformity between the surface and subsurface highs in the Cisco Lake region just north of the town of Cisco. The light contour lines are drawn upon observed surface points, and the dark heavy contours are on the subsurface structure based upon drill holes on the Ranger pay. It will be noted that in all the four pronounced noses, as reflected by surface mapping at the north of this structure, a similar pronounced high is indicated by subsurface work.

It is apparent that the old land mass that was taken down to a peneplane before the Barnett shales and the Bend group were deposited was folded in a northeast-southwest direction. This is supported by the fact that the caverns in the Llano uplift or Central Minerals region all extend in this direction. Figure 2, M. G. Chaney's early map of the Bend Arch area, further establishes this point. These trends are represented on the east side of the Bend Arch by noses and on the west side by terraces. The surface nosing that plunges to the northwest, and the folding that was caused by the Bend Arch uplift, produced sharp pronounced nosing where it crossed the older Ellenburger



Southwest Mapping Co., Fort Worth

Fig. 2—Index map of West Central Texas oil fields showing the six obvious trends in the northeast-southwest direction

folds, and might account for the older age production along these trends. Every field in this general area is located on one of these plunging noses, or on the west side of a terrace.

It might be suggested that the same lines of weakness that existed in the Ellenburger and pre-Cambrian beds are still responsible for the plunging noses and the rapid dipping monoclines away from the terraces in the Bend group. It is a notable fact that all the production is found, particularly on the west edge of terraces, where the dip is very rapid to the northwest.

Several interesting facts are shown on the accompanying index map, Figure 3, of West Central Texas oil fields. Beginning with the McMillian field in Runnels County, and extending through to the southwest corner of Montague County there is a series of pools representing a distinct trend in the northeast-southwest direction, including Bryson, Bunger, Breckenridge, South Bend, Ibex, Moran, and Mountry-Hatchett fields. This may correctly be termed the Breckenridge trend. Along this axis production is from the Lower Bend series and up through to the Cisco group. In Ibex a good oil well is producing from the Ellenburger; the Ordovician production from the South Bend pool is also on this trend. The newly discovered Oplin oil and gas field in the Ellenburger is definitely on this axis.

The second, or Ranger trend, is roughly shown through northeastern Coleman County, where upper production is had at Cross Plains, Ranger, Strawn, and in the Satterfield area on the Stephens-Palo Pinto County line, where a big gas well produced from the Ellenburger for many years. Development on to the northeast has not been sufficient to define the extent of the Ranger trend in that direction. The Cisco Lake production from the Ellenburger seems to be out of line, but would be properly associated with this trend. In most of the fields along this trend where the Ellenburger has been tested, good showings or production was found.

The third, or Desdemona trend, starts at the Brownwood field and runs northeastward through Seeps Springs, Desdemona, X-Ray and Brazos fields. The Goss wells from the Ellenburger are on this trend at Seeps Springs; good showings were had in deep wells drilled on the north side of the Desdemona field; and a Brazos field deep test also had attractive Ellenburger showings.

Another trend from the Abilene area of Taylor County northeastward through the Cook field and into the New Castle field in Young County is incompletely developed yet. On this Abilene trend there are no Ordovician tests to the writer's knowledge.

Another definite trend has been established through Noodle Creek, Avoca, Ivy, Moody and into southwestern Archer County, which is designated as the Avoca trend

The Royston field, Fisher County, is undoubtedly on another trend that will follow the same d!-

(Continued on Page 139)

Detailed Statistical Record of Texas Fields Made for Easy Reference

The following presentation of the fields of Texas, showing the number of producing wells, total number of flowing wells, number of wells on artificial lift, number of wells actively drilling, the daily average current production and the accumulated production by districts forms a very interesting and valuable set of reference tables on the largest producing state.

The figures are as of recent date. The monumental job of assembling the data took weeks of time and the result represents a picture that dates no farther back than March 1, and in some cases to more recent dates. Had it been possible to bring the figures down to April 1, there would have been no material change in the percentages of total flowing wells and total wells on artificial lift. Of the 79,185 oil wells listed, 32,770, or 41 plus per cent, were flowing naturally, and 46,415, or 59 minus per cent, were pumping or on some other form of mechanical lift. Every producing region in the state is included in the tables which were assembled by The Oil and Gas Journal's Texas editorial staff.

Down to April 1, 1938, Texas had produced 5,228,129,901 bbls. of oil, the value of which was $5,698,661,591, or an average of about $1.09 per barrel.

The production of Texas down to the close of 1937 represented about 25 per cent of all the oil produced in the United States and over 16 per cent of all the oil produced in the world. No foreign country has produced as much oil as the Lone Star state. Russia under the czars and the soviets produced down to the close of 1937 a total of 3,794,577,000 bbls., or about 74 per cent of the total credited to Texas.

Texas' production down to the end of last year was equal to that of Mexico, Venezuela, Colombia, Germany, Rumania, the Dutch East Indies and Iraq (Asia Minor) all rolled together. One single pool in Texas, the East Texas field, which down to the close of 1937 produced 1,120,710,000 bbls. of oil, was exceeded by only three foreign countries, Russia, Venezuela and Mexico. It dwarfs such important foreign producing countries as Netherlands India, British India, Rumania, Iran (Persia), Poland, Peru, Colombia, Argentina and the lesser producing nations. The Hendrick pool in Winkler County has produced more oil than any South American country outside of Venezuela.

SUMMARY OF PRODUCING WELLS, FLOWING AND PUMPING, IN TEXAS

	Total producing wells	Total flowing wells	Total wells on artificial lift	Wells drilling	Daily average production	Accumulated production
West Texas	7,913	4,218	3,695	200	179,064	871,986,942
Texas Panhandle	3,707	138	3,569	128	72,795	307,032,000
Central Texas	6,632	440	6,192	118	23,042	329,887,611
North Texas	16,994	718	16,276	344	66,260	598,224,000
East Texas field	24,730	19,630	5,100	120	425,972	1,145,784,963
East Central Texas	3,012	1,072	1,940	58	88,997	412,951,699
Gulf Coast Texas:						
Upper Gulf Coast	5,733	3,431	2,302	133	184,099	1,074,534,615
Lower Gulf Coast	2,510	1,887	623	101	128,154	133,722,077
Southwest Texas:						
San Antonio district	3,396	104	3,292	40	23,560	187,137,035
Laredo district	4,558	1,132	3,426	83	76,218	118,956,114
Total all fields	79,185	32,770	46,415	1,325	1,268,161	5,180,217,056

WEST TEXAS DISTRICT

Field—	County	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	Depth of structure	Daily avg. production	Accumulated production	Year discovered
Addis (South Cowden)	Ector	14	7	7	3	3,900	285	750,000	1934
Bashara	Winkler	5	2	3	0	2,480	105	.....	1929
Bennett	Yoakum	12	12	0	4	5,000	940	108,000	1937
Big Lake	Reagan	217	19	198	1	2,400-3,000-8,500	6,442	90,029,786	1925
Carter	Glasscock	2	1	1	0	2,625	15	1,000	1936
Cowden (North)	Ector	197	181	16	10	4,200	6,060	6,860,000	1930
Deep Rock-Fuhrman	Andrews	34	26	8	7	4,350	1,300	*1,496,000	1932
Duggan	Cochran	5	5	0	3	5,000	400	33,000	1937
Eaves	Winkler	6	6	0	0	3,000	340	60,000	1929
Emperor	Winkler	54	49	5	2	2,833	1,120	105,000	1935
Foster	Ector	98	38	60	11	4,100	3,430	923,000	1936
Goldsmith-Cummins	Ector	387	365	22	9	4,100	10,840	3,737,000	1935
Grand Falls-O'Brien	Ward	1,303	1,034	269	14	2,200-2,500	21,856	†38,493,000	1929
Halley	Winkler	31	25	6	2	2,725	635	1,087,000	1934
Harper	Ector	42	33	9	27	4,200	2,365	366,000	1935
Henderson	Winkler	121	121	0	2	3,035	3,025	1,558,000	1936
Hendrick	Winkler	391	124	267	2	2,600	12,210	188,539,000	1929
Howard-Glasscock	Howard and Glasscock	798	4	794	9	1,400-1,700-2,200 2,500-3,000	12,830	79,315,000	1927
Iatan-East Howard	Howard	245	19	226	0	2,500	6,635	7,688,000	1927
Jordan	Crane	33	29	4	4	3,590	1,050	109,000	1934
Kermit	Winkler	816	776	40	5	2,800	16,080	11,627,000	1934
Keystone	Winkler	81	77	4	6	3,400	2,330	1,632,000	1935
Leck	Winkler	9	2	7	0	3,000	430	3,146,000	1929
Mason	Loving	6	1	5	0	3,900	385	83,000	1937
McCamey-Hurdle	Upton	885	158	727	8	2,200	18,680	‡37,508,000	1926
Means	Andrews	55	35	20	4	4,540	1,685	1,504,000	1936
Mertzon	Irion	10	6	4	0	1,340	20	118,000	1928
Mitchell-Scurry	Mitchell and Scurry	132	17	115	0	3,000	770	§9,331,000	1922
Netterville	Pecos	16	12	4	0	2,200	300	151,000	1936
Parker	Andrews	2	0	2	0	4,700	28	37,000	1934
Pecos Valley	Pecos	97	46	51	1	1,350	1,200	1,288,000	1928
Penwell	Ector	162	109	53	8	3,600	3,650	17,213,000	1931
Post	Garza	9	2	7	0	2,775	25	4,000	1935
Sand Hills	Crane	46	42	4	2	4,250-6,000	1,265	654,000	1931
Scanlan	Dawson	1	0	1	0	5,100	35	156	1937
Scarborough	Winkler	100	70	30	6	2,980	1,450	4,177,000	1927
Seminole	Gaines	5	5	0	2	5,000	150	26,000	1937
Skelly	Grayson	6	0	6	0	3,135	135	509,000	1928
Slaughter	Hockley	5	4	1	5	4,980	60	2,000	1937
Snyder	Howard	14	5	9	3	2,700	435	50,000	1937
Taylor-Link	Pecos	67	8	59	1	1,000-1,650	1,355	4,745,000	1930
Toborg	Pecos	198	0	198	0	350	1,755	4,866,000	1929
Church-Fields-McElroy	Crane	442	127	315	4	2,800	10,525	104,839,000	1927
Waddell	Crane	40	35	5	3	1,300	1,223	1,621,000	1927
Wasson	Gaines and Yoakum	33	30	3	28	4,880	2,740	168,000	1937

WEST TEXAS DISTRICT (continued)

Field—	County	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	Depth of structure	Daily avg. production	Accumulated production	Year discovered
Wheat	Loving	85	63	22	0	4,200	1,300	6,932,000	1924
World	Crockett	41	0	41	1	2,600	790	5,569,000	1925
Yates	Pecos	555	488	67	3	900-1,200	18,480	232,829,000	1928
Total		7,913	4,218	3,695	200	....	179,061	871,986,942	....

*Includes Fuhrman-Tripplehorn-Walker fields. †Includes Dobbs-Monroe-North Ward, Seely, Shipley, South Ward-Wilson. ‡Includes Crane-Cowden-Webb-Ray. §Includes Northwest and Westbrook.

WEST CENTRAL TEXAS DISTRICT

Field—	County	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	Depth of structure	Daily avg. production	Accumulated production	Year discovered
Cross Cut	Brown	206	8	198	0	1,200	360	6,000,000	1922
Fry	Brown	117	8	109	0	1,300	305	7,715,000	1927
Stover	Brown	201	10	191	0	1,200	490	2,437,000	1928
Other pools	Brown	549	0	549	11	....	225	12,508,000	....
Total Brown County		1,073	26	1,047	11	....	1,390	28,660,000	....
Oplin	Callahan	2	2	0	1	....	100	5,000	1938
Isenhoor	Callahan	143	13	130	0	700	150	2,105,000	1924
Moutray	Callahan	114	4	110	0	750	280	1,359,400	1927
Other pools	Callahan	1,018	18	1,000	9	....	610	9,833,600	....
Total Callahan County		1,277	37	1,240	10	....	1,140	13,303,000	....
Total Coleman County		341	5	336	5	....	835	9,360,000	....
Sipe Springs	Comanche	94	0	94	2	500	50	1,400,000	1921
Total Eastland County		565	90	475	7	....	2,400	94,814,611	....
Roynston	Fisher	105	3	102	2	3,100	1,200	8,400,000	1928
Rotan	Fisher	19	8	11	3	3,600	975	120,000	1934
Other pools	Fisher	9	0	9	3	....	325	487,000	....
Total Fisher County		133	11	122	8	....	2,500	9,007,000	....
Hawley	Jones	65	12	53	2	1,950-2,220	2,400	1,980,000	1930
Noodle Creek	Jones	91	0	91	0	2,515	540	6,345,000	1926
Avoca	Jones	14	13	1	21	3,241	....	....	1937
Other pools	Jones	189	20	169	15	....	2,435	1,916,000	....
Total Jones County		359	45	314	38	....	5,375	10,241,000	....
Total Haskell County		6	0	6	0	1,800	11	98,000	1928
Strawn	Palo Pinto	149	39	110	1	1,850	170	2,945,000	1916
Other pools	Palo Pinto	41	4	37	5	....	90	1,650,000	....
Total Palo Pinto County		190	43	147	6	....	260	4,595,000	....
Cook	Shackelford	351	24	327	4	1,300	2,100	14,000,000	1926
Bluff Creek	Shackelford	145	16	129	4	1,600	2,450	2,325,000	1931
Other pools	Shackelford	1,373	107	1,266	16	....	850	17,359,000	....
Total Shackelford County		1,869	147	1,722	24	....	5,400	33,684,000	....
Breckenridge	Stephens	470	20	450	4	2,000	2,650	104,650,000	1923
Other pools	Stephens	208	16	192	0	....	800	18,925,000	....
Total Stephens County		678	36	642	4	....	3,450	123,575,000	....
X-Ray	Erath	17	0	17	0	2,000	92	....	1922
Total Runnels County		18	0	18	1	....	90	902,000	....
Total Taylor County		12	0	12	2	....	70	248,000	....
Total		6,632	440	6,192	118	....	23,042	329,887,611	....

SAN ANTONIO DISTRICT

Field—	County—	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	(a) Depth of structure	Daily avg. production	Accumulated production	Year discovered	Type of structure
Alta Vista	Bexar	32	0	32	1	250-1,100	5	38,000	1912	Sand lensing
Batesville	Zavalla	1	0	1	0	3,900	.....	12,000	1937	Faulting
Byersville	Williamson	35	0	35	0	900	98	445,000	1933	Serpentine plug
Branyon (incl. Ellison-Young)	Caldwell	123	7	116	3	2,000-2,400	1,795	824,000	1931	Faulting
Buchanan	Caldwell	36	1	35	2	900-2,400	385	248,000	1929	Faulting
Burdette-Wells	Caldwell	12	5	7	3	2,200	60	8,500	1937	Faulting
Carroll Estate	Bastrop	7	0	7	0	2,300	95	78,000	1932	Serpentine plug
Cedar Creek	Bastrop	9	0	9	0	1,700	45	209,000	1933	Serpentine plug
Chacon Lake	Medina	34	0	34	1	200-900	18	22,000	1929	Serpentine plug
Chapman-Abbott	Williamson	70	0	70	0	1,800	230	4,250,000	1930	Serpentine plug
Dale	Caldwell	42	5	37	2	2,300	145	1,195,000	1927	Faulting
Dale—North	Bastrop	13	3	10	0	2,200-2,600	122	5,000,000	1932	Faulting
Darst Creek	Gaudalupe	291	28	263	3	2,600	6,460	42,116,739	1929	Faulting
Dunlap	Caldwell	14	8	6	3	2,100-2,400	73	283,000	1931	Faulting
Eckert	Bexar	119	0	119	1	700-1,000	151	797,000	1928	Sand lensing
Gas Ridge	Bexar	14	0	14	0	300-800	6	2,000	1912	Sand lensing
Hilbig	Bastrop	12	12	0	0	2,500	349	1,240,000	1933	Serpentine plug
Ina	Medina	9	0	9	0	800	6	157,000	1923	Faulting-lensing
Kimbro	Travis	1	0	1	0	670	1	(†)	1935	Serpentine plug
Larremore	Caldwell	11	0	11	0	1,000-1,300	90	253,000	1928	Faulting
Luling	Caldwell	530	3	527	8	1,900-2,100	7,103	67,577,000	1922	Faulting
Lytton Springs	Caldwell	161	0	161	0	1,200-1,600	320	7,541,000	1925	Serpentine plug
Manda	Travis	3	0	3	1	750	7	16,000	1934	Serpentine plug
Manford	Gaudalupe	1	0	1	0	2,400	10	(‡)	1929	Crevice on fault
Minerva-Rockdale	Milam	412	0	412	1	900-1,600	170	3,362,000	1921	Sand lensing and fault'g

SAN ANTONIO DISTRICT (continued)

Field—	County—	Producers wells	Flowing wells	Wells on artificial lift	Active rigs	(a) Depth of structure	Daily avg. production	Accumulated production	Year discovered	Type of structure
Nash Creek	Gaudalupe	1	0	1	1	2,500	55	12,000	1937	Crevice
Nolte	Gaudalupe	1	0	1	0	1,700	.....	796	1937	Crevice
Pearsall	Frio	19	10	9	0	3,900-6,200	517	611,000	1934	Domal type
Salt Flat	Caldwell	227	6	221	3	2,200-2,700	4,150	36,883,000	1928	Faulting
Somerset	Atascosa	924	16	908	2	900-2,100	625	10,717,000	1911	Sand lensing and fault'g
Southton	Bexar	104	0	104	1	900	35	592,000	1922	Sand lensing
Staples	Guadalupe	1	0	1	0	700	3	1,000	1935	Faulting
Taylor	Medina	3	0	3	2	350	10	298,000	1936	Faulting and crevice
Thrall	Williamson	15	0	15	0	950	41	2,398,000	1915	Serpentine plug
Von Ormy	Bexar	83	0	83	1	700	145	85,000	1931	Sand lensing
Yost	Bastrop	6	0	6	0	1,500	40	885,000	1928	Serpentine plug
Zoboroski	Guadalupe	20	0	20	1	2,200	195	80,000	1931	Faulting
Total		3,396	104	3,292	40	....	23,560	187,137,035		

†Production included with Manda. ‡Production included in Darst Creek. (a) Depth range of producing sands.

LOWER GULF COAST DISTRICT

Field—	County—	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	(a) Depth of structure	Daily avg. production	Accumulated production	Year discovered	Type of structure
Alfred	Jim Wells	1	1	0	2	5,300	60	.....	1938	Faulting
Agua Dulce	Nueces	23	.....	23	4	2,000-4,900	175	306,000	1928	Domal type
Baldwin	Nueces	23	15	8	0	3,200-4,000	240	447,000	1935	Sand lensing, faulting
Bentonville	Nueces	8	8	0	0	3,800-5,600	344	285,000	1932	Sand lensing
Caesar	Bee	28	4	24	0	3,000	290	777,000	1934	Folding against fault
Chapman Ranch	Nueces	2	1	1	0	6,400	20	29,000	1937	Sand lensing
Clara Driscoll	Nueces	21	17	4	1	3,200-5,400	701	466,000	1935	Sand lensing
Clara Driscoll—South	Nueces	1	0	1	1	3,900-5,200	39	19,033	1937	Sand lensing
Coletto Creek	Victoria	20	19	1	0	2,100-4,400	399	716,000	1933	Anticline
Dirks	Bee	98	42	56	0	3,900	2,466	3,601,000	1934	Sand lensing, faulting
East Telferner	Victoria	1	1	0	1	5,100	36	480	1938	Sand lensing
Flour Bluff	Nueces	100	99	1	4	6,600	4,856	1,700,000	1936	Anticline
Foley (Halzmark)	Bee	3	1	2	0	3,400-4,100	22	17,000	1935	Sd. lensing against fault
Fort Merrill	Live Oak	1	0	1	0	4,700	8	32,000	1935	Faulting
Greta	Refugio	210	189	21	4	4,400	7,685	19,687,000	1933	Sd. lensing, domal type
Heyser	Calhoun and Victoria	122	119	3	9	5,400-6,000	6,454	1,681,000	1936	Nosing
Hordes Creek	Goliad	2	2	0	0	4,200	21	28,000	1929	Sd. lensing against fault
Keeran	Victoria	12	11	1	1	5,100-5,800	490	668,000	1932	Domal type
Kingsville	Kleberg	8	0	8	1	1,400-3,200	48	683,000	1920	Domal type
Lamar	Aransas	1	1	0	0	7,900	..	1,000	1937	Domal type
London	Nueces	2	1	1	0	4,700-4,900	60	30,000	1937	Nosing sand lens
Luby	Nueces	25	25	0	5	5,050	1,258	79,000	1937	High, cut by faults
Lucas	Live Oak	10	6	4	0	2,000-5,200	102	233,000	1923	Sand lensing
Lucas—North	Live Oak	3	0	3	0	5,200	18	62,000	1935	Sand lensing
McCampbell	Aransas	108	108	0	6	6,500-7,100	4,510	945,000	1936	Faulting, sand lensing
McFaddin	Victoria	3	0	3	1	2,000-6,100	343	78,000	1930	Anticline, sand lenses
McFaddin—North	Victoria	1	0	1	4	4,400	55	2,000	1937	Sand lensing
McNell	Live Oak	5	1	4	0	4,300-5,000	71	199,000	1934	Closure against fault
Midway	San Patricio	9	9	0	1	5,300	370	74,000	1937	Domal type
Mineral (Hicks)	Bee	1	0	1	0	3,400	12	.....	1936	Sd. lensing against fault
Normanna	Bee	4	2	2	1	1,900-3,600	62	57,000	1929	Faulting
Normanna—North	Bee	1	1	0	1	4,200	60	.....	1938	Faulting
O'Connor	Refugio	3	2	1	0	2,200-4,100	106	414,000	....	Faulting
Oakville	Live Oak	1	0	.....	0	2,800	10	4,000	1928	Faulting
Pettus	Bee	36	15	21	0	2,900-3,900	770	8,356,000	1929	Sd. lensing against fault
Pettus—North	Bee, Goliad, Karnes	72	32	40	0	3,800-3,900	1,325	2,618,000	....	Sand lensing
Placedo	Victoria	161	111	50	2	4,700-6,000	9,407	4,436,000	1935	Anticline, sand lens
Plummer	Bee	8	8	0	1	3,000	179	43,000	1935	Sd. lensing against fault
Plymouth	San Patricio	148	146	2	3	5,300	13,510	9,174,000	1935	Local high on anticline
Port Lavaca	Calhoun	9	7	2	0	6,200	93	404,000	1934	Fault, some folding
Premont	Jim Wells	30	4	26	3	2,200-3,100	410	293,000	1933	Domal type
Premont—East	Jim Wells	1	1	0	1	6,500	....	1,377	1938	Domal type
Ray	Bee	23	0	23	0	3,900	417	1,252,000	1935	Sd. lensing against fault
Refugio	Refugio	151	104	47	4	1,900-6,600	4,603	36,016,000	1920	Domal type
Richard King	Nueces	2	2	0	1	4,000	75	5,000	1937	Domal type
Rutledge (Worthington)	Bee	1	0	1	0	3,400	....	21,000	1935	Sand lensing, faulting
Sandia	Jim Wells	3	1	2	0	2,900-5,100	26	13,000	1929	Anticline
Sarco	Goliad	1	0	1	1	5,000	9	.....	1938	Sand lensing
Saxet	Nueces	588	440	148	12	1,000-6,700	37,215	22,370,178	1923	Sand lensing, faulting
Saxet Heights	Nueces	151	101	50	2	4,000	3,240	4,996,361	1935	Sd. lensing, domal type
Sinton	San Patricio	1	1	0	0	5,400-5,900	20	52,635	1934	Anticline
Slick	Goliad	1	0	1	0	4,200-4,400	....	68,499	1930	Faulting, folding
South Burnell	Karnes	29	28	1	3	3,600	1,044	153,981	1937	Sand lensing
Stratton	Nueces	4	0	4	1	4,800-6,000	206	30,189	1931	Sd. lensing, domal type
Strauch (McMurry)	Bee	2	0	2	0	4,300	6	5,000	1937	Sand lensing
Taft	San Patricio	66	63	3	1	3,900-4,900	2,548	1,648,942	1935	Sand lens against fault
Tomoconnor	Refugio	235	235	0	8	5,500-5,900	10,678	6,689,000	1934	Domal type
Tuleta—West	Bee	36	11	25	0	3,900	431	1,591,000	1934	Sand lensing
Voss	Bee	4	2	2	0	4,000	34	68,992	1936	Closure against fault
Weslaco	Hidalgo	1	1	0	0	8,600	62	New field	1938	Domal type
White Point	San Patricio	2	2	0	0	1,900-4,900	35	93,410	1919	Anticline
West Saxet	Nueces	3	3	0	10	5,800	260	1,000	1938	Elongated domal type
White Point—East	San Patricio	1	1	0	2	5,600	100	.....	1938	Anticline
Total		2,510	1,887	623	101	....	128,154	133,722,077		

(a) Depth range of producing sands.

UPPER GULF COAST DISTRICT

Field—	County—	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	(a) Depth of structure	Daily avg. production	Accumulated production	Year discovered	Type of structure
Ace	Polk	2	1	1	0	4,800	78	100,000	1933	Domal type
Allen dome	Brazoria	1	0	1	0	4,300-5,500	14	86,000	1927	Salt dome
Amelia	Jefferson	109	106	3	4	5,300-6,700	3,745	1,165,000	1936	Domal type
Anahuac	Chambers	227	226	1	3	7,000	7,872	4,310,000	1935	Domal type
Ariola	Hardin	10	2	8	0	3,000-4,700	415	1,676,000	1932	Salt dome
Bammel	Harris	2	2	0	0	6,400	gas	7,000	1937	Domal type
Barbers Hill	Chambers	165	36	129	3	4,000-7,100	9,645	61,217,000	1916	Salt dome
Batson	Hardin	212	23	189	1	350-5,500	1,610	38,256,000	1903	Salt dome
Bay City (Hamman)	Matagorda	6	6	0	3	8,100-9,200	783	190,000	1936	Domal type
Big Creek	Fort Bend	26	0	26	0	1,700-4,900	686	9,367,000	1922	Salt dome
Big Hill	Jefferson	0	.....	.....	0	1,800-5,000	0	14,000	1923	Salt dome
Big Hill	Matagorda	0	.....	.....	0	800	.....	211,000	1904	Salt dome
Blue Ridge	Fort Bend	54	0	54	0	2,000-4,800	835	10,561,000	1919	Salt dome
Boling	Wharton and Ft. Bend	83	35	48	0	400-4,600	1,336	5,622,000	1925	Salt dome
Brenham	Washington	22	.....	22	0	275-1,500	29	349,000	1915	Salt dome
Brookshire	Waller	1	0	1	0	2,900	.....	18,000	1934	Salt dome
Bryan Mound	Brazoria	0	.....	.....	0	....	0	0	*1901	Salt dome
Buckeye	Matagorda	3	3	0	0	7,800-9,900	241	662,000	1932	Domal type
Call	Newton	1	1	0	1	6,918	.....	6,000	1937	Domal type
Cedar Bayou	Chambers	1	1 (dead)	0	1	6,390	.....	680	1938	Domal type
Cedar Point	Chambers	1	1	0	0	6,030	.....	.....	1938	Domal type
Cheek	Jefferson	1	1	0	0	7,725	105	750	1938	Domal type
Cheek—North	Jefferson	2	2	0	1	8,400-8,600	143	27,000	1937	Domal type
Clam Lake (McFaddin)	Jefferson	1	1	0	0	5,925	129	1,000	1938	Domal type
Clay Creek	Washington	52	5	47	0	1,100-1,500	476	3,958,000	1928	Salt dome
Clemons	Brazoria	0	.....	.....	0	....	0	0	*1926	Salt dome
Cleveland	Liberty	9	0	9	1	5,800	424	924,000	1933	Domal type
Clinton (Greens Bayou)	Harris	2	1	1	1	3,200-8,100	36	8,000	1936	Domal type
Conroe	Montgomery	937	910	27	0	5,000-5,100	30,146	86,834,000	1931	Domal type
Cotton Lake	Chambers	18	18	0	1	6,300-6,500	1,249	403,000	1935	Domal type
Damon Mound	Brazoria	34	1	33	1	1,400-3,800	310	9,333,000	1915	Salt dome
Danbury	Brazoria	3	2	1	2	1,900	146	11,000	1929	Salt dome
Davis Hill	Liberty	0	....	.....	0	....	0	0	*1905	Salt dome
Dickinson	Galveston	109	107	2	8	8,000-9,100	5,877	2,948,000	1934	Domal type
Edna	Jackson	5	5	0	0	3,900-5,400	11	1,000	1921	Sand lensing
Esperson	Liberty	36	6	30	1	2,200-5,800	930	4,795,000	1929	Salt dome
Eureka	Harris	1	1	0	1	7,600	19	35,000	1934	Domal type
Fairbanks	Harris	1	1	0	3	6,800	87	1,871	1938	Domal type
Fannett	Jefferson	19	3	16	1	3,200-6,600	534	2,204,000	1927	Salt dome
Friendswood (Webster)	Harris	26	26	0	5	6,000	1,424	93,000	1937	Domal type
Ganado	Jackson	3	3	0	0	5,100	36	14,000	1937	Sand lensing
Garwood	Colorado	1	1	0	0	6,034	.....	2,000	1932	Domal type
Goose Creek	Harris	94	0	94	1	1,000-4,600	1,523	76,079,000	1906	Domal type-sand lenses
Greens Lake	Galveston	1	0	1	0	3,800	23	29,000	1936	Domal type
Hankamer	Liberty	31	9	22	1	2,500-5,100	1,101	4,905,000	1929	Salt dome
Hardin	Liberty	23	23	0	13	7,600	2,590	429,000	1935	Domal type
Hastings	Brazoria and Galveston	478	474	4	10	6,080	18,311	8,887,000	1934	Domal type
Hawkinsville	Matagorda	0	0	0	0	5,200	....	2,466	*1936	Salt dome
High Island	Galveston	61	22	39	2	3,200-600	2,150	14,270,000	1922	Salt dome
Hitchcock	Galveston	2	2	0	2	5,200	163	18,000	1937	Domal type
Hockley	Harris	0	.....	.....	..	1,796-2,400	0	16,000	1923	Salt dome
Hoskins	Brazoria	0	.....	.....	..	500-600	0	32,000	1904	Salt dome
Hull	Liberty	207	41	166	1	400-5,200	8,445	84,498,000	1918	Salt dome
Humble	Harris	277	9	268	0	700-5,600	2,985	122,594,000	1905	Salt dome
Katy	Waller	3 (shut in)	3	0	0	7,200-7,500	gas	Shut in	1935	Domal type
Kittrell	Houston	13	0	13	0	1,900-2,000	823	1,121,000	1934	Salt dome
La Belle	Jefferson	1	1	0	1	8,206	23	15,000	1937	Domal type
Lakeview	Wharton	1 (shut in)	1	0	0	3,200	gas	Shut in	1936	Domal type
Livingston	Polk	89	50	39	0	4,200	2,172	4,272,000	1932	Domal type
Lockridge	Brazoria	29	29	0	3	6,300	984	279,000	1936	Domal type
Long Point	Fort Bend	0	0	0	0	....	0	205,825	*1928	Salt dome
Lost Lake	Chambers	8	0	8	0	2,800	125	892,000	1929	Salt dome
Louise	Wharton	35	29	6	1	5,100	1,337	1,749,000	1933	Domal type
Magnet	Wharton	18	16	2	3	5,500	856	129,000	1936	Domal type
Manvel	Brazoria	159	103	56	2	3,800-5,700	9,360	10,844,000	1931	Domal type
Markham	Matagorda	39	19	20	1	900-2,000	1,518	6,551,000	1908	Salt dome
Mauritz	Jackson	2	2	0	0	5,600	143	110,000	1935	Sand lenses
McCrosky	Matagorda	1	1	0	1	6,600	70	.....	1938	Domal type
Moss Bluff	Liberty	0	0	0	0	5,800	0	0	1930	Salt dome
Mykawa	Harris	30	0	30	0	4,100	1,988	2,995,000	1929	Domal type
Nash	Brazoria and Ft. Bend	1	0	1	0	4,500-5,600	16	1,664,000	1926	Salt dome
Nome	Jefferson	41	41	0	2	6,000	1,461	641,000	1936	Domal type
North Dayton	Liberty	12	2	10	0	400-5,100	90	2,294,000	1905	Salt dome
Old Ocean	Brazoria	9	9	0	3	8,600-10,600	2,390	730,000	1934	Domal type
Orange	Orange	49	6	43	0	2,500-5,300	733	32,224,000	1933	Domal type-sand lenses
Orange—West	Orange	2	2	0	6	5,900	200	16,000	1937	Domal type
Orchard	Fort Bend	15	5	10	2	2,600-4,100	369	3,305,000	1926	Salt dome
Palacios	Matagorda	3	3	0	2	7,800-9,200	380	31,000	1937	Domal type
Picketts Ridge	Wharton	38	35	3	2	4,700	1,345	1,421,000	1935	Sand lensing
Pierce Junction	Harris	71	12	59	2	3,100-6,700	3,225	31,789,000	1921	Salt dome
Port Neches	Orange	19	3	16	1	3,100-5,900	1,333	4,482,000	1929	Domal type
Raccoon Bend	Austin and Waller	173	74	99	0	3,100-4,100	3,556	19,040,000	1928	Domal type
Rockland	Jasper	0	0	0	0	1,200	Field abd.	35,012	1928	Faulted condition
Sandy Point	Brazoria	6	6	0	0	6,400	248	51,000	1937	Domal type
Saratoga	Hardin	228	0	228	0	500-3,300	862	28,456,000	1901	Salt dome
Satsuma	Harris	9	9	0	0	6,800	458	158,000	1936	Domal type
Seabreeze	Chambers	7	7	0	2	8,400	329	37,000	1936	Domal type
Segno	Polk	29	29	0	3	5,100-5,300	1,760	474,000	1937	Domal type

IDEAL

SWIVELS

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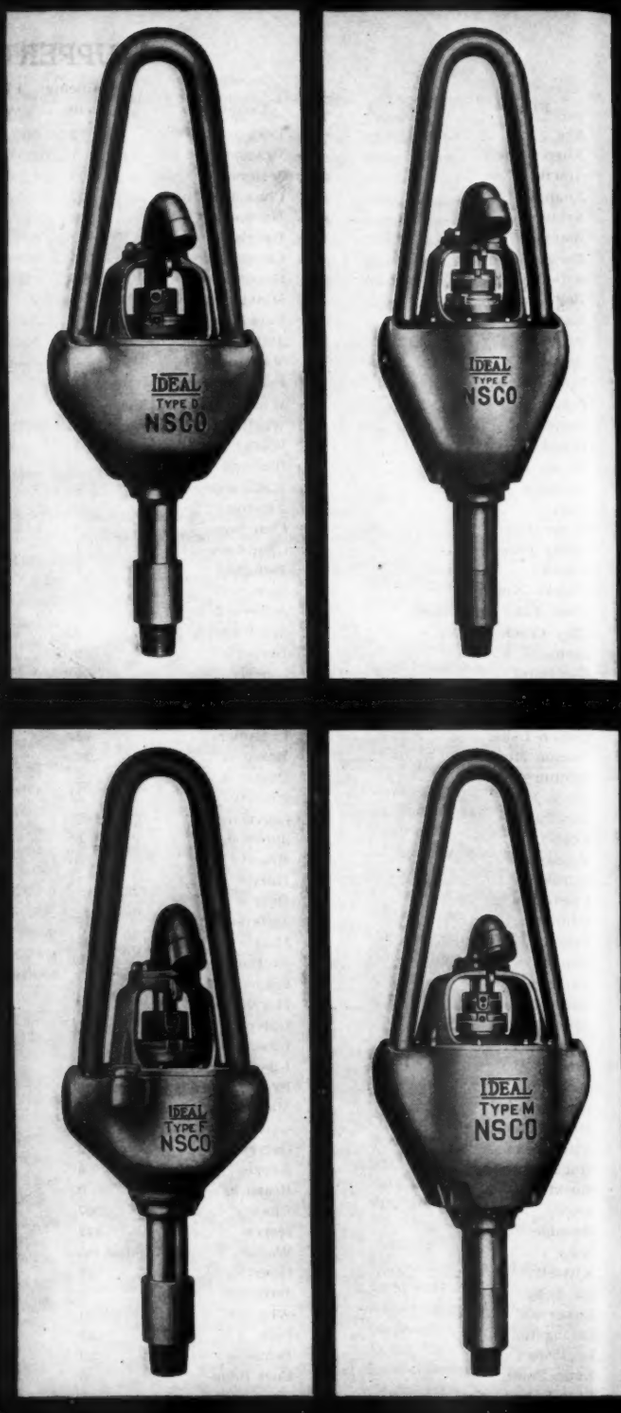

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GENERAL SALES OFFICE: TOLEDO, OHIO

UPPER GULF COAST DISTRICT (continued)

Shepherds Mott	Matagorda	0	0	0	0	....	0	1,011	1935	Domal type
Silsbee	Hardin	28	28	0	1	6,900	1,607	429,000	1936	Domal type
Sour Lake	Hardin	150	12	138	0	500-4,400	1,285	78,544,000	1902	Salt dome
South Houston	Harris	95	70	25	0	3,700-4,800	3,281	1,966,000	1935	Salt dome
South Liberty	Liberty	44	0	44	0	700-4,900	551	15,282,000	1925	Salt dome
Spanish Camp	Wharton	4	4	0	0	3,000	gas	.....	1935	.....
Spindletop	Jefferson	140	5	135	2	800-5,800	2,054	123,918,000	1901	Salt dome
Splendora	Montgomery	1	1	0	0	5,800	gas	.....	1934	Nosing
Spurger (Joe's Lake)	Tyler	6	6	0	1	7,600	450	68,000	1937	Domal type
Stratton Ridge	Brazoria	0	0	0	0	4,300-4,650	.....	12,000	1922	Salt dome
Sugarland	Fort Bend	51	42	9	0	2,900-3,900	3,040	26,183,000	1928	Salt dome
Thompson	Fort Bend	207	185	22	1	3,000-5,450	10,480	25,833,000	1931	Domal type
Tomball	Harris, Montgomery	318	311	7	4	5,600	6,717	8,816,000	1933	Domal type
Turtle Bay	Chambers	28	23	5	2	6,600	946	485,000	1935	Domal type
Vanderbilt	Jackson	1	0	1	0	5,500	48	140,000	1934	Sand lenses against fault
Van Vleck	Matagorda	24	24	0	2	8,400	2,527	1,186,000	1934	Domal type
West Beaumont	Jefferson	34	34	0	1	5,200-6,500	1,356	361,000	1936	Domal type
West Columbia	Brazoria	47	17	30	7	600-5,900	3,598	80,321,000	1915	Salt dome
Withers	Wharton	4	4	0	2	5,500	1,463	799,000	1936	Domal type
Total		5,733	3,431	2,302	133	. . .	184,099	1,074,534,615		

*Discovery date represents year first salt drilled.

(a) Depth range of producing sands.

LAREDO-GOVERNMENT WELLS DISTRICT

Field—	County—	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	(a) Depth of structure	Daily avg. production	Accumulated production	Year discovered	Type of structure
Albercas	Webb	20	5	15	0	2,100	48	2,465,094	1927	Sand lens, folding
Alta Mesa	Brooks	16	15	1	2	1,210-3,000	410	166,025	1926	Domal type
Alta Verde	Brooks	4	2	2	2	900	68	1,129	1936	Salt dome
Aviator	Webb	68	0	68	1	1,500	309	5,671,318	1922	Sand lensing
Barbacoas	Starr	2	1	1	1	200-5,400	8	27,199	1933	Domal type
Bruni, E. Bruni, and E. Cole	Webb	37	24	13	0	3,400	728	2,145,098	1934	Sand lensing
Callihan	McMullen	52	0	52	1	875-1,000	208	658,401	1918	Sand lensing
Carolina-Tex	Webb	3	0	3	0	1,200-5,000	8	251,000	1921	Domal type, sand lensing
Charamousca	Duval	15	3	12	1	1,600	245	99,571	1935	Sand lensing, faulting
Charco Redondo	Zapata	31	0	31	0	200	12	146,171	1913	Sand lensing
Cole	Webb	56	0	56	0	500-3,400	383	3,946,190	1924	Sand lensing
Colmena	Duval	25	8	17	1	1,500	343	148,038	1934	Sand lensing
Colorado	Jim Hogg	1	0	1	1	3,000	30	16,012	1936	Sand lensing
Comitas	Zapata	166	17	149	0	1,000	513	678,831	1934	Sand lensing
Cuellar	Zapata	23	0	23	0	1,100-1,300	99	2,496,422	1927	Sand lensing
Cuevitas	Starr	13	0	13	0	2,000-2,200	226	594,368	1933	Sand lensing
Driscoll	Duval	18	15	3	1	500-2,900	754	957,348	1924	Sand lensing
Eagle Hill	Duval	21	3	18	1	1,400-2,100	246	635,283	1933	Sand lensing
Escobas	Zapata	359	79	280	1	1,100-1,500	1,850	7,099,576	1929	Sand lensing
Ezzell	McMullen	53	7	46	9	1,500	1,312	112,000	1937	Sand lensing
Government Wells	Duval	732	18	714	1	1,500-2,400	12,195	33,881,000	1928	Sand lensing
Henne-Winch-Farris	Jim Hogg	1	0	1	0	1,900	5	3,205,000	1924	Sand lensing
Hoffman—South	Duval	115	95	20	3	2,600	2,227	942,000	1937	Sand lensing
Jacobs	McMullen	73	0	73	0	700-900	510	993,000	1926	Sand lensing
Killam	Webb	60	15	45	4	2,000	1,079	138,000	1937	Sand lensing
Kohler—North	Duval	2	2	0	0	2,600	44	20,000	1936	Sand lensing
Kohler—South	Duval	16	5	11	0	1,800-2,400	148	532,000	1926	Sand lensing
Labbe	Duval	16	4	12	2	2,400-2,900	310	82,000	1934	Sand lensing
La Blanca	Hidalgo	6	6	0	0	6,600-7,900	496	91,000	1936	Domal type
Los Mestenas	Hidalgo	1	1	0	0	6,600	10	5,040	1935	Domal type
Laurel	Webb	6	0	6	0	1,700-2,200	10	605,000	1932	Sand lensing
Loma Alto	McMullen	3	0	3	1	2,200	67	63,000	1935	Sand lensing
Loma Novia	Duval	719	92	627	0	2,700-2,800	13,800	12,072,000	1934	Sand lensing
Loma Vista	Duval	1	0	1	0	2,900	6	10,000	1936	Sand lensing
Lopez	Webb and Duval	393	98	295	0	2,200	6,587	4,521,000	1935	Sand lensing
Los Almos	Starr	82	6	76	0	400-700	100	521,000	1925	Sand lensing
Lundell	Duval	14	12	2	2	1,500	228	42,000	1937	Sand lensing
Mercedes	Hidalgo	3	3	0	1	7,400	80	27,000	1935	Domal type
Mirando City	Webb	71	0	71	0	1,500-1,900	328	8,740,000	1921	Sand lensing
Mirando Valley	Zapata	9	0	9	2	1,400	18	642,000	1921	Sand lensing
Moca	Webb	10	0	10	0	900	326	730,000	1932	Sand lensing
O'Hern	Webb	227	157	70	0	2,700-2,900	5,037	3,634,000	1927	Sand lensing
Oilton	Webb	99	30	69	12	1,900	1,559	142,000	....	Sand lensing
Palangana	Duval	0	0	0	0	450	0	10,000	1928	Salt dome
Peters	Duval	7	7	0	1	1,800-2,700	138	83,000	1933	Sand lensing
Piedras Pintas	Duval	1	0	1	0	2,100	27	144,000	1905	Salt dome
Piedre de Lumbre	Duval	60	22	38	2	1,300-2,100	892	523,000	1935	Sand lensing
Randado	Jim Hogg	99	7	92	0	1,200	233	4,458,000	1926	Sand lensing
Ricaby and S. Ricaby	Starr	12	10	2	2	1,300-1,700	129	63,000	1937	Sand lensing
Rio Grande City	Starr	17	0	17	1	1,300	109	285,000	1932	Sand lensing
Roma	Starr	2	2	0	0	200-3,600	6	10,000	1927	Anticlinal
Samfordyce	Hidalgo and Starr	191	141	50	5	2,700-2,900	3,760	4,964,000	1934	Anticlinal
Sarnosa	Duval	50	0	50	0	2,400	635	1,822,000	1932	Sand lensing
Seven Sisters	Duval	316	59	257	1	2,200-2,600	8,039	5,779,000	1935	Sand lensing
Sweden	Duval	5	5	0	1	5,800	192	63,000	1937	Anticline
Sweden—North (Benavides)	Duval	150	150	0	13	3,800-5,300	9,000	790,000	1937	Anticline
Thomas-Lockhart	Duval	5	5	0	1	4,600	88	9,000	1937	Sand lensing
Rincon	Starr	1	1	0	0	....	gas	.....	1938	Sand lensing
Total		4,558	1,132	3,426	83	....	76,218	118,956,114	....	

(a) Depth range of producing sands.

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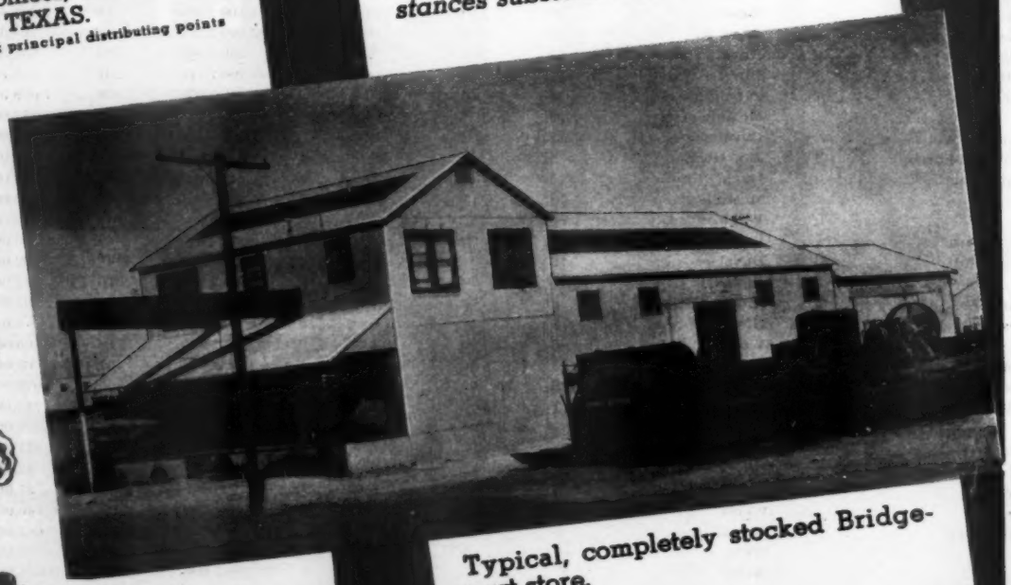

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ODESSA L. D. 683 Local 684
TULSA L. D. 681 Local 5-3204
OKLAHOMA CITY L. D. 785 Local 7-2725
WICHITA L. D. 59 and 116 Local 2-1431 and 2-1432
AND BRANCH STORES

NORTH TEXAS DISTRICT

Field—	County	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	Depth of structure	Daily avg. production	Accumulated production	Year discovered
Total Throckmorton County		143	0	143	4	....	315	3,100,000	....
South Bend	Young	75	0	75	5	4,000	360	10,162,000	1938
James	Young	43	34	9	12	3,900	2,000	1,800,000	1929
Other pools		1,971	3	1,968	20	....	7,240	48,151,000	....
Total Young County		2,089	37	2,052	37	....	9,600	60,113,000	....
Bryson	Jack	211	31	180	5	4,600	3,625	5,006,000	1933
Other pools		386	75	311	15	....	3,725	5,175,000	....
Total Jack County		597	106	491	20	....	7,350	10,181,000	....
Total Baylor County		164	4	160	1	....	1,325	3,557,000	....
Total Archer County		3,962	194	3,768	34	900-4,000	10,000	109,304,000	....
Total Wilbarger County		1,372	20	1,352	16	1,000-4,000	7,600	62,304,000	....
Burkburnett	Wichita	1,965	22	1,943	....	1,000-1,800	4,650	.....	....
Electra	Wichita	3,071	0	3,071	....	1,000-1,800	7,500	.....	....
K.M.A. (shallow)	Wichita	933	0	933	....	450-1,800	1,400	.....	1920
K.M.A. (deep)	Wichita	209	195	14	162	3,600-4,000	6,200	1,023,089	1931
Other fields		427	106	272	34	....	1,650	.....	....
Total Wichita County		6,605	323	6,255	196	....	18,100	301,767,000	....
Total Clay County		472	1	471	9	....	825	6,744,000	1904
Total Cooke County		716	0	716	13	....	5,500	13,376,000	1927
Total Denton County		4	0	4	2	....	20	2,000	1935
Total Foard County		15	6	9	1	....	610	1,287,000	1928
Total Grayson County		4	0	4	3	....	15	4,000	1936
Total Montague County		851	0	851	8	....	5,000	26,455,000	1924
Total		16,994	718	16,276	344	....	66,260	598,224,000	....

TEXAS PANHANDLE DISTRICT

	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	Depth of structure	Daily avg. production	Accumulated production	Year discovered
Total Carson County	422	20	402	9		7,190	27,559,000	1923
Total Gray County	1,730	69	1,661	47		33,245	138,614,000	1927
Total Hutchinson County	1,179	31	1,148	56		24,125	122,618,000	1924
Total Moore County	24	0	24	7	2,300	1,280	3,856,000	1928
Total Wheeler County	352	18	334	9	3,000	6,955	14,385,000	1927
Total Panhandle oil wells	3,707	138	3,569	128		72,795	.....	....
Total Panhandle gas wells	1,200	0	0	8		*650,000,000	†6,300,000	....
Total	3,707	138	3,569	128	....	72,795	307,032,000	....

*Cubic feet per day. †Million cubic feet estimated.

EAST TEXAS FIELD

Field—	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	Depth of structure	Daily avg. production	Accumulated production	Year discovered
East Texas	24,730	19,630	5,100	120	3,600	425,972	1,145,784,963	1931

EAST CENTRAL TEXAS DISTRICT (exclusive of East Texas Field)

Field—	County	Producing wells	Flowing wells	Wells on artificial lift	Active rigs	Depth of structure	Daily avg. production	Accumulated production	Year discovered
Bethany	Panola	3	0	3	0	1,000-4,700	29	.....	1919
Boggy Creek	Cherokee	21	0	21	0	3,630	351	4,644,000	1928
Caddo (Potter)	Marion	34	8	26	1	2,300	99	60,000	1906
Cayuga	Anderson	217	209	8	3	3,825	8,771	7,305,000	1934
Corsicana	Navarro	454	0	454	1	460-1,260	351	16,071,000	1900
Currie	Navarro	13	0	13	0	2,770	97	6,742,000	1923
Flag Lake	Henderson	3	3	0	5	3,000	100	5,000	1937
Grapeland	Houston	1	1	0	1	....	8	1,092	1937
Long Lake	Anderson	51	43	8	4	5,200	1,830	1,107,000	1934
Lott	Falls	2	0	2	0	2,700	20	6,000	1937
Mexia	Limestone	250	0	250	1	3,000	1,583	95,451,000	1920
Opelika	Henderson	2	2	0	0	7,000-9,000	3	1,000	1937
Percilla	Houston	1	1	0	0	2,800	56	12,000	1937
Powell	Navarro	160	0	160	0	2,900	1,710	112,661,000	1917
Richland	Navarro	2	0	2	0	2,900	18	6,630,000	1925
Rodessa	Marion-Cass	403	377	26	29	6,100	37,900	15,807,000	1935
Rusk	Cherokee	2	0	2	0	6,000	60	246,000	1935
Shelbyville	Shelby	1	0	1	0	....	8	3,853	....
South Bosque	McLennon	43	15	28	0	450	12	8,754	1904
Sulphur Bluff	Hopkins	64	16	48	1	4,500	4,080	1,605,000	1936
Tacoma	Panola	3	0	3	0	2,750	14	19,000	....
Talco	Titus	663	44	619	9	4,500	24,343	11,165,000	1936
Van	VanZandt	590	350	240	2	1,200-2,700	15,472	110,880,000	1930
Wortham	Freestone	10	0	10	0	3,000	72	22,521,000	1924
Waskom	Harrison	19	3	16	1	2,500	51	....	....
Total		3,012	1,072	1,940	58	....	88,997	412,951,699	....

Total producing wells, active rigs, and daily average production as of March 1, 1938. Accumulated production as of January 1, 1938.

Where heavy muds are required to hold formation pressures, BAROID-AQUAGEL muds can be maintained at desired weights with lower viscosities than other muds of same weight.

High viscosity muds are often the cause of blowouts. This is because they gas-cut more readily than lower viscosity muds and because they produce a swabbing effect. When a mud gas-cuts, the mud weight is reduced and if enough of the mud in the hole is reduced in weight so that the total pressure in the hole is less than the formation pressure, a blowout is liable to occur. Straight BAROID-AQUAGEL muds will permit more solids to be picked up in the hole from drilling operations before prohibitive viscosities are reached.

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McCamey Field Approaching Complete Electrification

By MITCHELL TUCKER

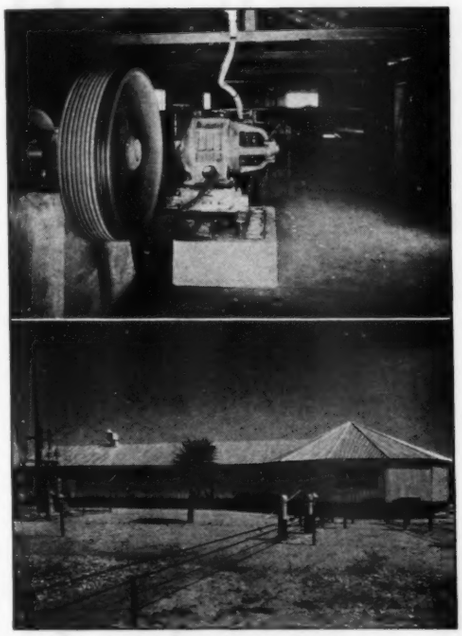


Fig. 1—Showing interior and exterior of a bandwheel power, electrically driven, in the McCamey field

The McCamey field of Upton County, Western Texas, is one of the most completely electrified oil fields known today. Purchased electrical power is used for central geared and bandwheel power pumping; for beam pumping on individual and back-side crank units; for drilling both shallow and deep wells; for cleaning out and reconditioning purposes; for refining; gathering and main line pipe line work; for crude oil treating: and for all other purposes.

This field was discovered in 1926 and has been steadily electrified since that time. Use of this type of power was encouraged for several reasons. In the first place, the gas produced with McCamey crude has a very high sulfur content, which rendered it expensive or unfit for fuel purposes.

The present wide system of electrical transmission lines and transformers throughout this 60-square mile producing area grew with the field, and has been readily accessible to all operations at all times. Service engineering assistance has been supplied by the power companies in the field in all installations, and in the education of the men on the utilization of electrical power. Operators in the field take advantage of the accessibility of purchased electrical power in all forms of their operations, being billed for all uses through one demand charge. By proper timing of their different operations during each 24-hour period, a minimum demand charge is established.

At the present time 874 wells are producing in the field, 157 of which are flowing naturally and 717 pumping. Of this number of pumping wells, approximately 90 per cent, or 645, are operating on electrical power.

Figure 1 illustrates the exterior and interior of a typical bandwheel power in the McCamey field. Topographical conditions in some parts of this mountainous country are unfavorable to long lead line operation, and hence some limitations are placed upon the number of wells which are pumped off each installation. Pumping depths range from 2,200 to 2,800 feet, depending largely on surface elevation. Most wells are pumped continuously. The transformer bank as shown in the exterior view of Figure 1 provides current for the power motor as well as other lease requirements. Transformer lines carry 12,000 volts and field transformers bring it down to 440 volts for field use. The interior view shows 50-horsepower electrical motor V-belt driven to jack shaft. Endless bandwheel belt, crossing idler, drives the bandwheel and eccentric.

Figure 2 shows a very attractive geared power installation in the field. This 35-horsepower motor is of weather-proof construction and protected by steel cover. At present nine wells are pumping from this unit.

One of the new type four-well geared pumping assemblies is shown in Figure 3. The 25-horsepower weather-proof motor V-belt drives through the gear box with cranks on both sides. Correct balance minimizes power requirements, and a very smooth and even operation is observed here. A much smaller motor would probably handle the load here, except when an unbalanced condition is made by one or more wells being off. The "floating" weights on the two-way swing post beams may be used to quickly bring the assembly into balance. Current for this installation has been reduced to 440 volts at another point on this lease.

Figure 5 shows a 5-horsepower electrical motor pumping two wells, one off a small crank from side of gear box. The small crank obviously indicates very short stroke. The length of stroke is lengthened somewhat by position of pitmans and swing post. It is considered good practice, however, to install the smallest type electrical motor and pump continuously or over long periods of time, rather than use a large motor and obtain the production allowed in an hour or two. Such extended pumping time permits the operator to operate on a much smaller demand charge, and at the same time preserve his surface and subsurface pumping equipment from unnecessary strains.

Figure 6 shows another of the same type. Here the 7½-horsepower electrical motor and V-belt

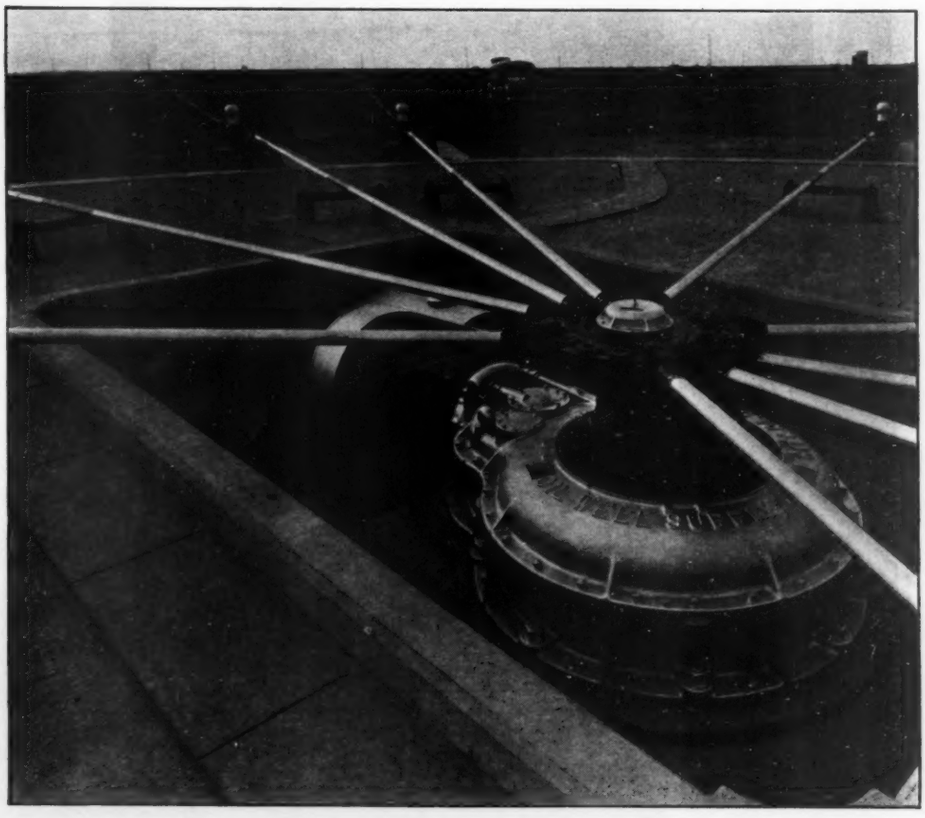
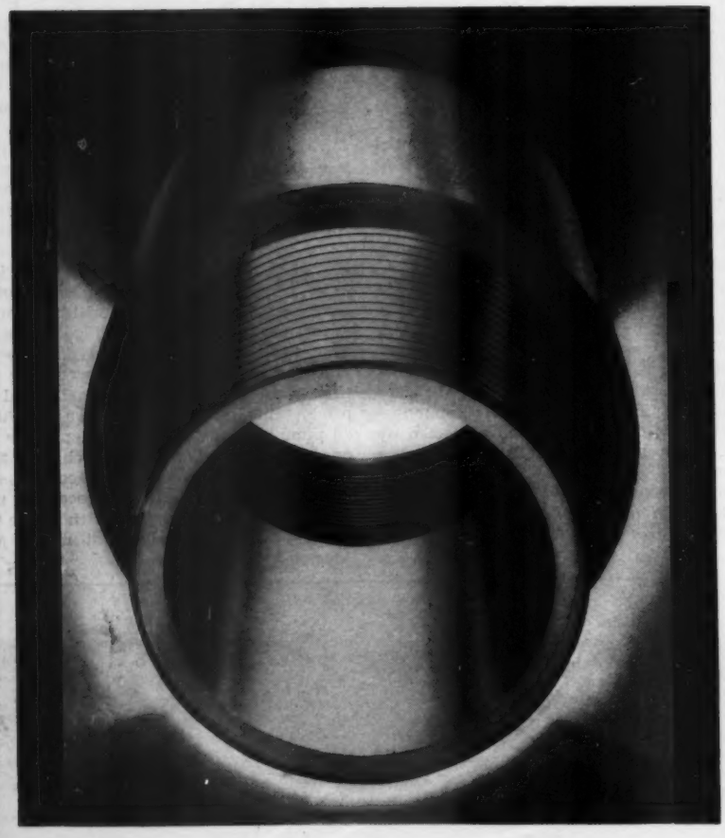
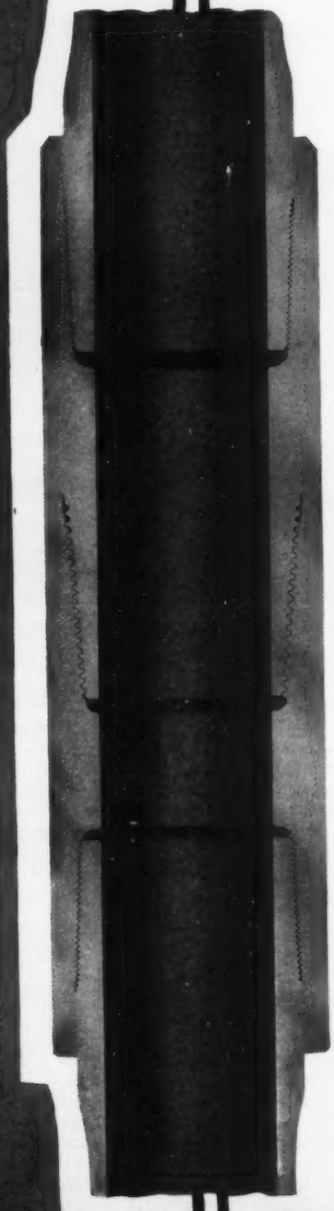


Fig. 2—An attractive geared-power installation at McCamey. This unit is electrically driven and was recently completed on the Continental Oil Co. properties in that field. Note the attractive design of the concrete foundations and walk-ways

Again REED PIONEERS A NEW TOOL JOINT





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shielded by guard, operates into the small gear box. Pitman to one crank operates the pumping unit at the well, while the pitman on the other crank extends to stroke post, thence to an offset location. Normal operation is in near-complete balance.

Reconditioning

Electrical power is made accessible to all portable clean-out or reconditioning rigs at any point in the McCamey field by the laying of large three-conductor No. 2 Cooper cables, rubber insulated. These are provided in 600- to 1,000-foot lengths by the power companies, and are laid on the ground from the nearest transformer bank, or from the nearest electrically operated unit. Figure 7 shows such a portable cleaning-out unit in operation. Note the rubber insulated electrical cable running to the motor house. The 50-horsepower electrical motor is mounted on skids for quick movement from location to location along with the portable machine. An endless belt extends thrugh belt hall to the cleaning-out machine.

Drilling

During 1937 a total of 128 wells was drilled in the McCamey field, most of which used electricity as drilling power. Cable tools are universally used to the producing depth, requiring the 15-35 to 35-60-horsepower drilling motors. The greatest peak load imposed upon the motors is in the running and setting of the oil string of casing. Those wells drilled on or near the mountain peaks, which necessitates a few hundred feet more drilling, of course requires the larger type drilling motors.

The famous deep test drilled several years ago on the McCamey structure to a depth of 9,918 feet was drilled by electricity, employing two 100-horsepower motors on the pumps and two 125-horsepower motors on the drawworks.

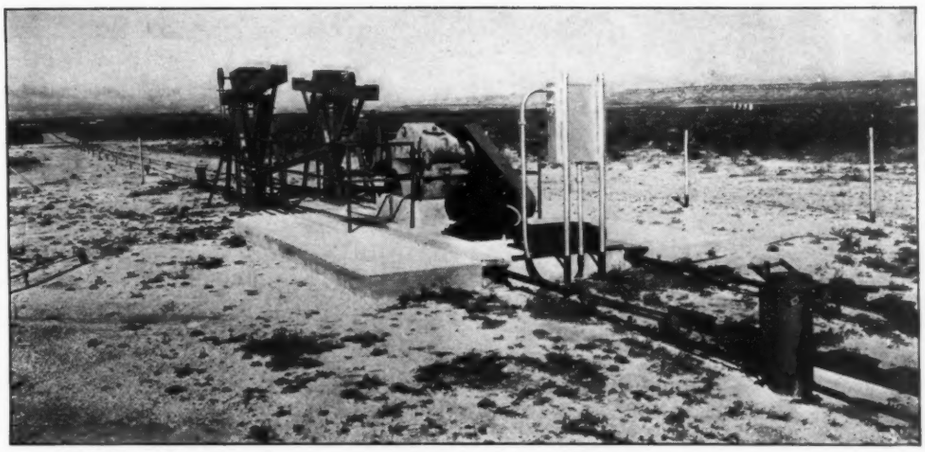


Fig. 3—Electrically operated four-well geared pumping assemblies as seen at new installations in McCamey field

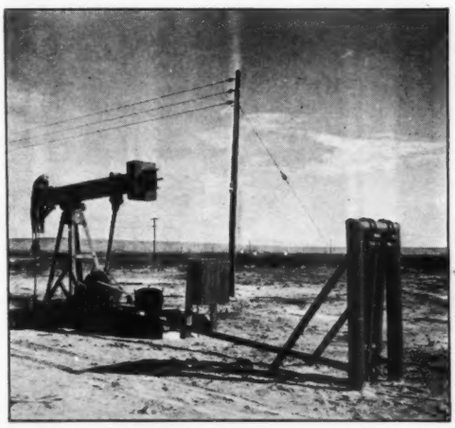


Fig. 5—A 5-horsepower electrical installation handling two wells. Extended pumping times permit use of smaller motors, hence lower demand charges

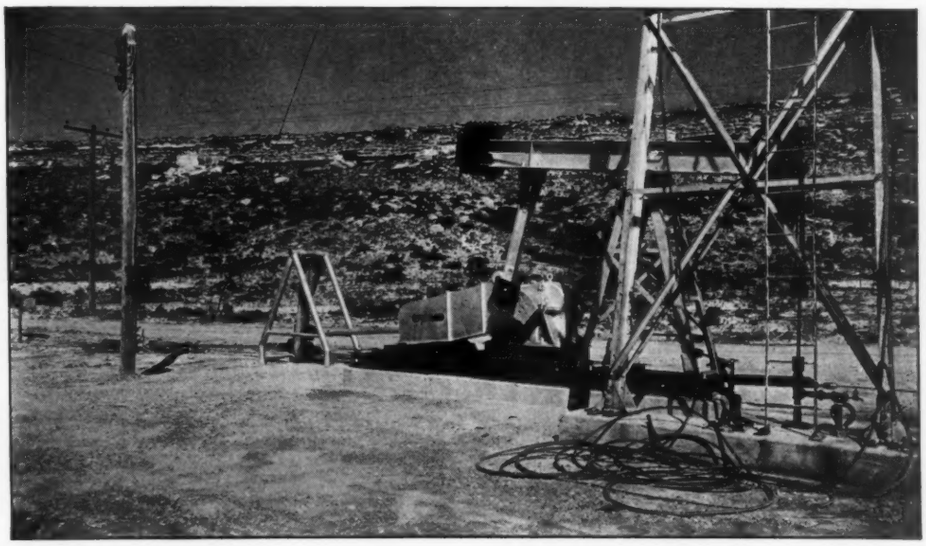


Fig. 6—A 7½-horsepower electrical motor on individual pumping unit, handling an offset well on backside crank. This is a typical installation in the McCamey area where pumping equipment has been installed recently

Figure 8 shows a view of electrically operated cable tool rig at McCamey. The rubber insulated cable running on the ground is from a nearby transformer bank, and is delivering current to the motor end of the rig. Figure 9 shows interior view of the motor room at this rig. Note the controller box and grids which are installed to afford the driller the necessary speed variations for all drilling operations. The cord seen wrapped around the controller box head extends up to the derrick floor, providing the driller his control over the motor house.

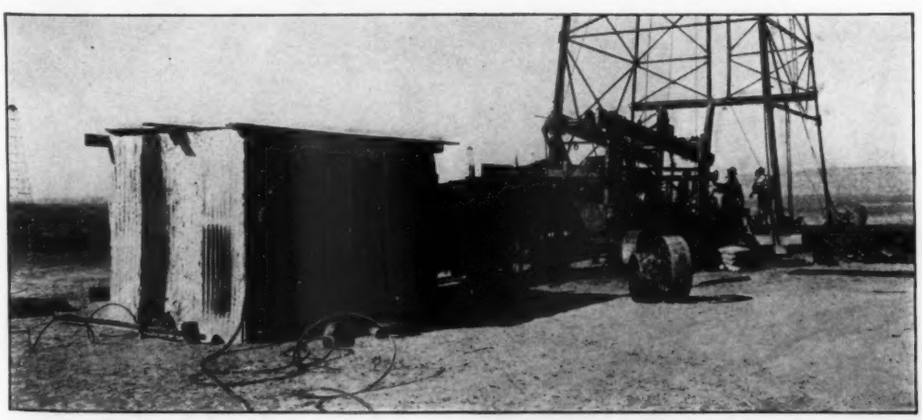


Fig. 7—Cleaning-out rig at McCamey, using electrical motor mounted on skids as power. The rubber insulated cable on the ground is delivering power to motor house

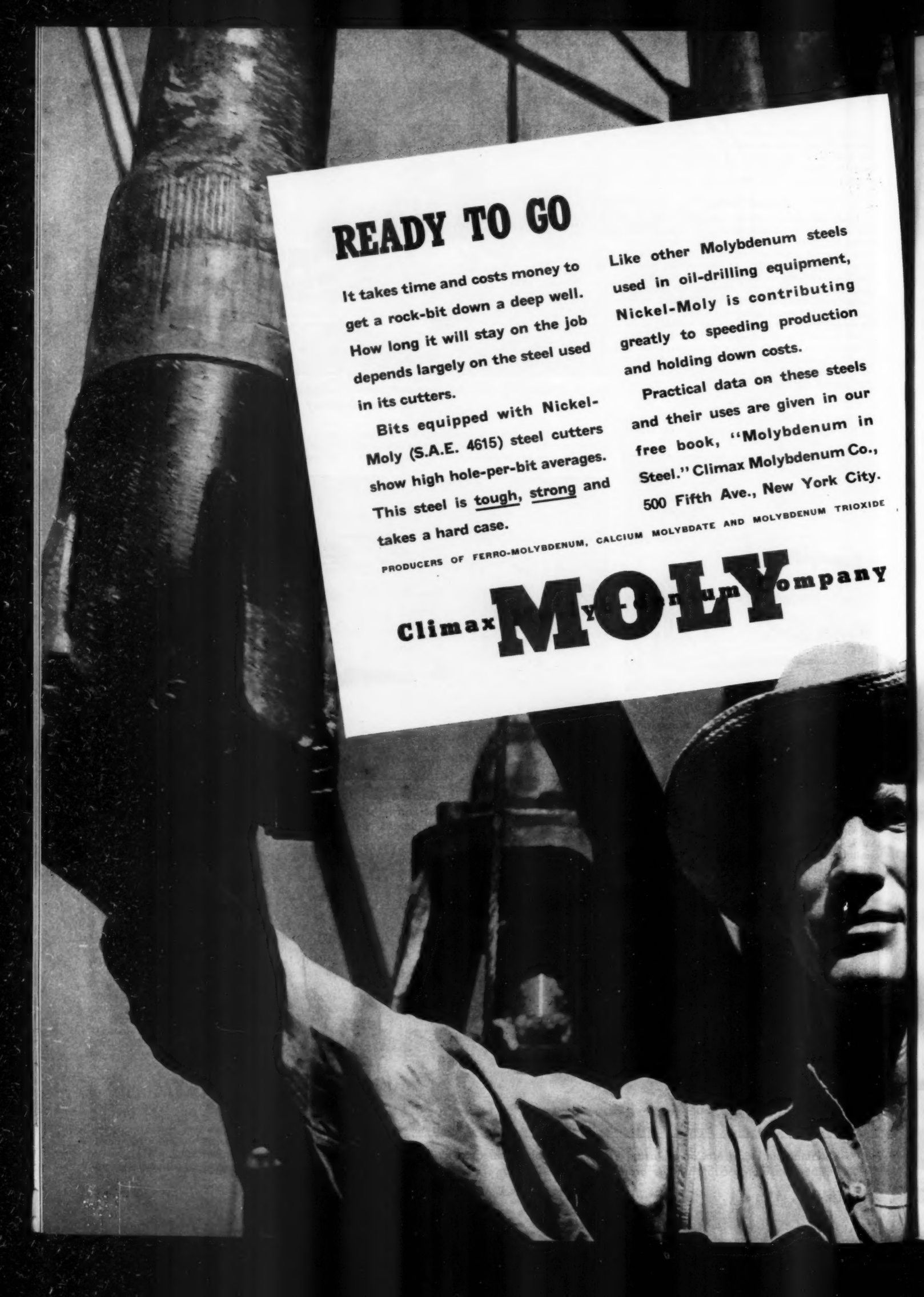
Crude Oil Testing

The treating of crude oil emulsions has always been a serious problem at McCamey. The close similarity between the specific gravity of the crude and water, together with the low boiling point of the oil, has rendered gravitational or heating methods unsatisfactory in some cases. Electrical dehydrators are widely used in this field for breaking of the water-oil emulsions. Figure 10 shows an attractive electrical treating tank and battery. There are 25 such dehydrator installations in the field.

Pipe Lines

Many gathering systems take advantage of gravity in this irregular country to provide movement of oil from lease storage to pipe line station tankage, but in those locations where gathering stations are required, electrically operated centrifugal or reciprocal pumps are employed.

Figures 11 and 12 show the interior of the



READY TO GO

It takes time and costs money to get a rock-bit down a deep well. How long it will stay on the job depends largely on the steel used in its cutters.

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largest pipe line station out of the field, that of Shell Pipe Line Co. It is divided into sides, that shown in Figure 11 using electrical motor-driven centrifugal pumps, delivers about 15,000 bbls. daily into the Houston system. That portion of the station shown in Figure 12, using electrical motor-driven reciprocating pumps, discharges into Shell's eastern system, terminating at Whiting, Ill.

Refining

Prior to the abandonment of Humble Oil & Refining Co.'s large refinery at McCamey, electrical

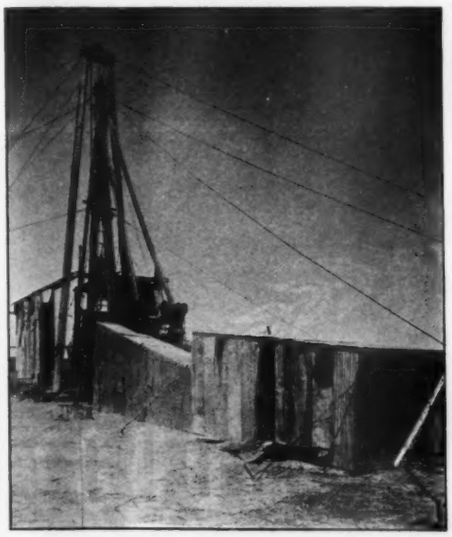


Fig. 8 — Exterior of electrically operated cable tool drilling rig at McCamey. Power is being delivered through insulated cable seen on the ground

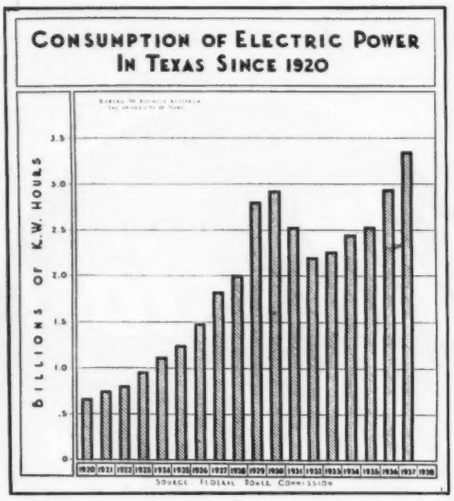
power was used, giving this famous electrified field a complete spread into all types of field requirements.

Domestic Uses

Because of the low demand rates afforded those companies which use electrical power in all their field requirements, they are able to supply current

Fig. 9—Interior of same drilling rig. Controller box and grids are ahead of the motor. The cord seen wrapped around the controller box head extends up onto the derrick floor, providing the driller his control over the motor house

to employes' houses at very low rates. Electrical ranges, refrigerators, heaters and all other household appliances are widely used in company camps in the McCamey field. Additional transformers are provided at each camp site to step the voltage down from 440 as used in field operations, to 115 volts for domestic use.



The above data includes all electric power used in the state and does not represent only that used by the oil industry

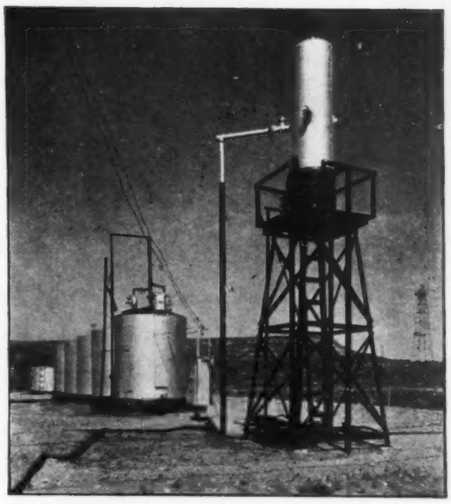


Fig. 10—An attractive electrical dehydrator installation at McCamey

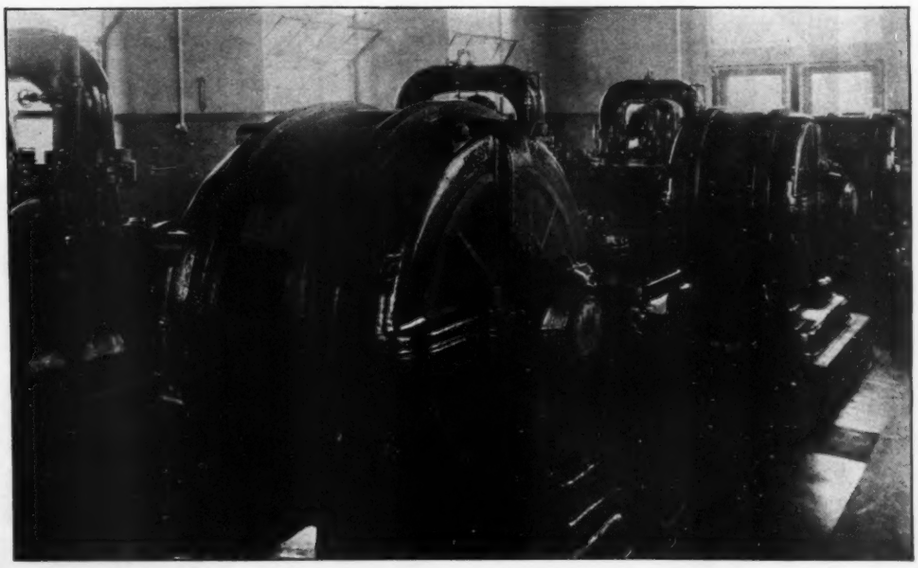


Fig. 11—Electrical centrifugal pumps used on the south or Houston side of Shell Pipe Line Co.'s two-way McCamey station

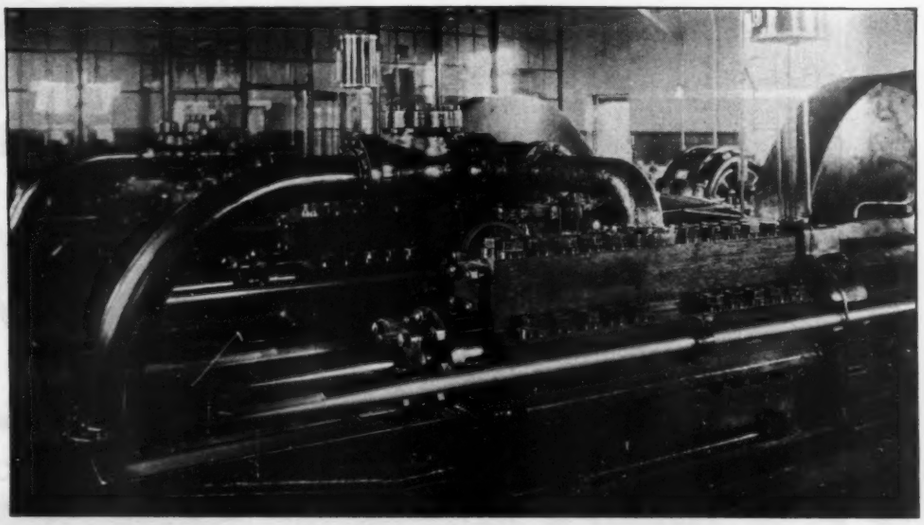


Fig. 12—Electrical reciprocating pumps used on the north or Illinois side of Shell Pipe Line Co.'s two-way McCamey station

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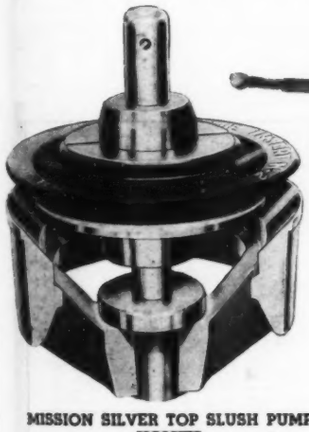

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Standardization of Surface Control Equipment

By MADDEN T. WORKS
Engineer, Cameron Iron Works, Inc., Houston, Tex

Standardization in certain types of equipment and forms of procedure is nothing new in the oil fields. It is only recently, however, that operators have realized the substantial economies, the increased convenience, and the savings in time that may be effected by standardizing on an integrated plan for setting up and interchanging drilling control hookups.

In the past it has been the general custom to set the blowout preventers and flow-line control manifold on the first string of casing without any particular forethough as to how the setting would coordinate with subsequent operations. Needless to

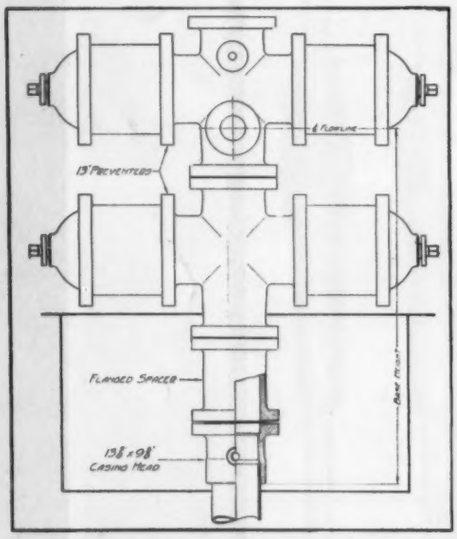

Fig. 1—Flow-line provides the center line for reference in all space calculations

say, this rather haphazard procedure often caused delay and expense in changing the drilling control hookup for each string of casing set.

To eliminate delay, inconvenience and expense, progressive operators in Texas and elsewhere are now surveying the problem in its entirety before commencing operations, and working out a procedure that will correlate with all necessary changes in the drilling control foundation as successive strings of casing are set.

Follow Definite Program

To integrate the procedure is no great task, the only requirement being that the operator have a definite casing program outlined in advance, which is usually the case, even on wildcat locations.

For example, assume that the casing program will be 13⅜-, 9⅝- and 7-inch casing with 2½-inch tubing. Assume further that 13⅝-inch blowout preventers will be used while drilling through the 13⅜- and 9⅝-inch casing, and that 7-inch preventer equipment will be used on the 7-inch casing while drilling plugs and running tubing.

It is essential, of course, to decide what particular make of blowout preventers, casingheads and tubing head shall be used. The manufacturer of the equipment selected will gladly furnish the dimensions required to lay out the entire procedure. It is not necessary that drawings be made, as the desired dimensions may be obtained by addition and subtraction. For convenience, dimensions may be filled in on the accompanying sketches.

Interchange Parts

It is apparent, for the various setups to interchange with maximum facility and a minimum of special nippling-up, that the position of the blowout preventer flow-line opening should be identical for each setup. This eliminates the necessity of moving or changing the flow-line control manifold from the time the surface pipe is cemented until the well is turned into the tanks.

The center line of the flow-line opening of the blowout preventer should, therefore, be used as the point of reference. See Figure 1. Note that a

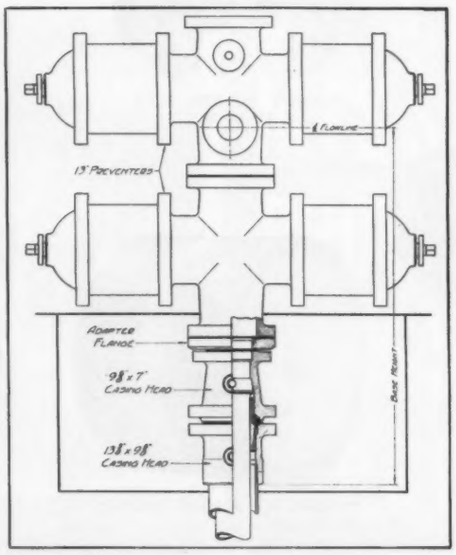

Fig. 2—Method for determining height necessary to drill through 9-5/8-inch casing

flanged spacer is used between top flange of casinghead and bottom flange of the lower blowout preventer. This or similar spacers are much more easily and quickly installed than changing the flow-line control manifold to meet requirements not determined in advance.

Determining Base Height

Assume now that in adding up the heights of the necessary pieces of equipment in each required setup it be found that the hookup necessary for drilling through the 9⅝-inch casing is the highest. See Figure 2. This height may then be termed the "base height." Since the derrick substructure definitely locates the top of the blowout preventers, the depth of the cellar and the proper location of the 13⅜-inch casinghead may easily be determined.

The next step is to subtract the normal height of the hookup for drilling through the 13⅜-inch surface casing from the already determined "base height" to arrive at the length of spacer spool necessary to use on the 13⅜-inch casing head in order that flow-line control manifold may be connected on. See Figure 1. Likewise, the height of the 7-inch setup may be subtracted from the "base height" to determine the length of spacer required between the bottom flange of the 7-inch blowout preventers and the top flange of the tubing head. See Figure 3. It will be remembered that the overall height of the hookup after 9⅝-inch casing has been set has already been determined as the highest and adopted as the "base height."

Flow-Line Manifold

Proceeding according to the simple rules laid down here, the flow-line control manifold may be installed in a fixed position when preventers are installed on the 13⅜-inch casing, and need not be moved or changed substantially thereafter until the well is completed. Since these manfolds have necessarily become more and more complex, to provide the increased degree of safety and control required as higher pressure wells are being drilled, this factor alone well compensates for the effort of integrating the procedure in advance. The system usually requires one or more inexpensive spacer

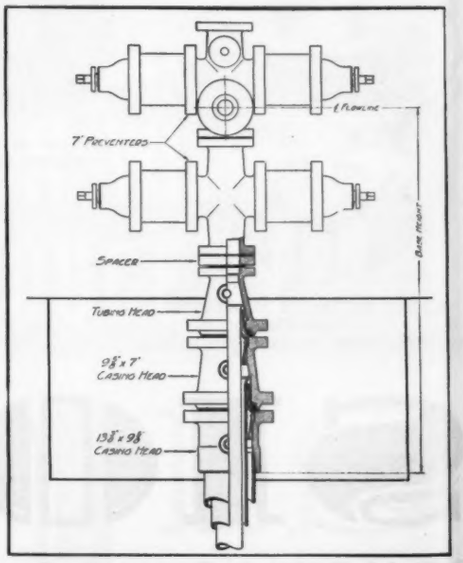

Fig. 3—Method for finding length of spacer between blowout preventer and tubing head

units, but the cost of these is quickly absorbed by savings in time, material and expense incident to unplanned "nipping-up." The spacers become a part of the drilling-control equipment and are moved from one location to another along with the drilling rig.

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Industry

LIKE THE "JALLOPY" OF OLD . . . the Standard Rig was a good "job" in its day. But no one would buy and use an outmoded "Jallopy" in preference to the modern, efficient, stream-lined automobile of this age.

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A modern installation of LUFKIN Universal Herringbone Gear Pumping Unit Assembly on the lease of a major oil company.

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Texas Leads All States in Oil Refining

By W. T. ZIEGENHAIN

Refineries located in Texas account for about one-third of the manufacturing operations of the oil industry in the United States. Texas leads all states and is the only one capable of processing 1,000,000 bbls. of crude oil daily. Furthermore, Texas leads by a comfortable margin.

As a manufacturer of refined products the state can satisfy its own requirements and in addition can supply the combined demands of such important states as New York, California, Illinois and Ohio. If the United States was split into two parts along the course of the Mississippi River, Texas could supply all of the oil requirements of that portion lying west of the river.

AVERAGE YIELDS IN TEXAS REFINERIES

(Barrels daily)

	At present	Ten years ago
Gasoline	480,000	79,600
Kerosene	62,000	34,900
Gas oil and fuels	375,000	138,100
Lubricants	23,000	18,600
Wax (lbs.)	189,600	144,500
Coke (tons)	870,900	200
Asphalt (tons)	1,100	1,100
Other products	500	8
Losses	9,000	11,800

In a general manner, this offers some measure of the importance of Texas as a refining state but it is of still greater significance to note that Texas is rapidly increasing its lead.

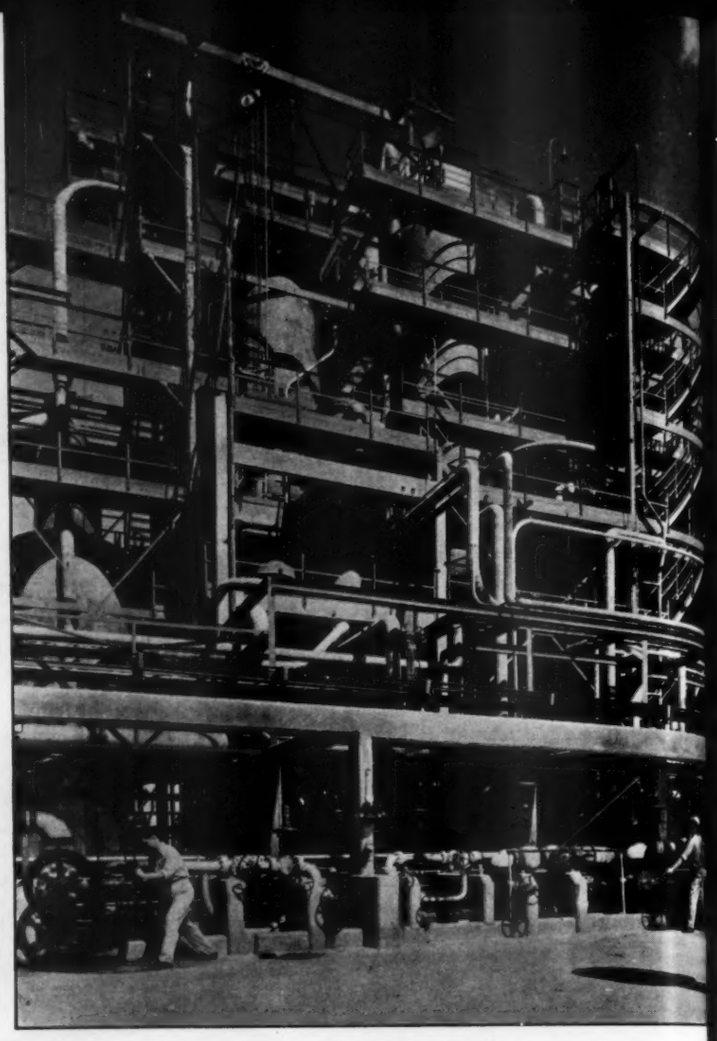
As refining capacity is needed to supply the increasing demand for gasoline among the eastern states, the industry has chosen to add to its Texas Gulf Coast plants rather than to its eastern seaboard refineries. This movement has been most pronounced in the past five years during which time several hundred thousand barrels of daily crude capacity has been added along the Gulf Coast, including the erection of two very large entire plants. The areas around Port Arthur, Beaumont and Houston have long been known as important refinery locations but within the past five years these have become the most important in the world.

From time to time Texas has witnessed boom conditions in the nine major oil producing sections of the state, starting with Spindletop in 1901, Burkburnett, West Texas, Panhandle, East Texas and the Southwest in succession. In each instance many small refineries were built and, as flush production declined, these refineries curtailed their operations and relatively few remained as permanent institutions. For example, in 1935, there were 85 refineries operating in East Texas and at present only 10 are active.

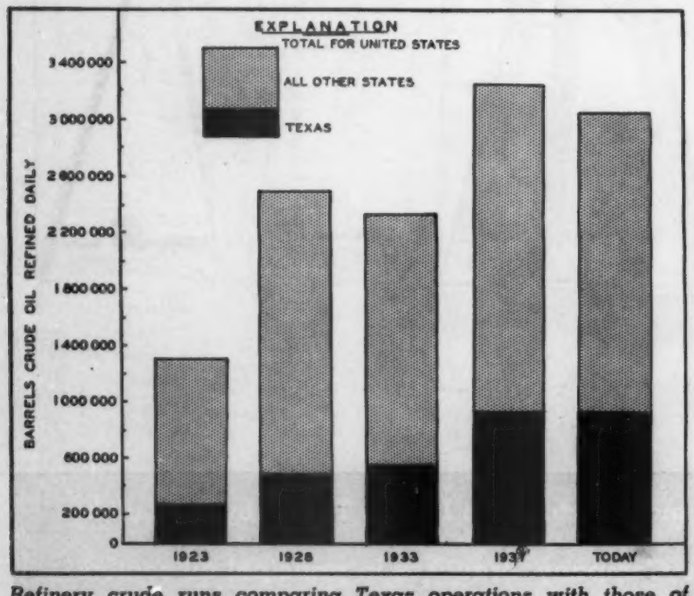
North Texas plants, which are numerous and enjoy favorable freight rates to inland markets, as well as export rates, have felt a shortage of local crude from time to time but in 1937 the intensive development of the K.M.A. area near Wichita Falls and the surrounding fields revealed huge underground reserves of crude oil and these will serve to guarantee a supply when and if the oil is needed to augment the quantity now moved to North Texas plants.

Similarly, large reserves of crude oil are invaluable in West Texas and in the Panhandle to guarantee the long existence of plants there even though no new supplies are found.

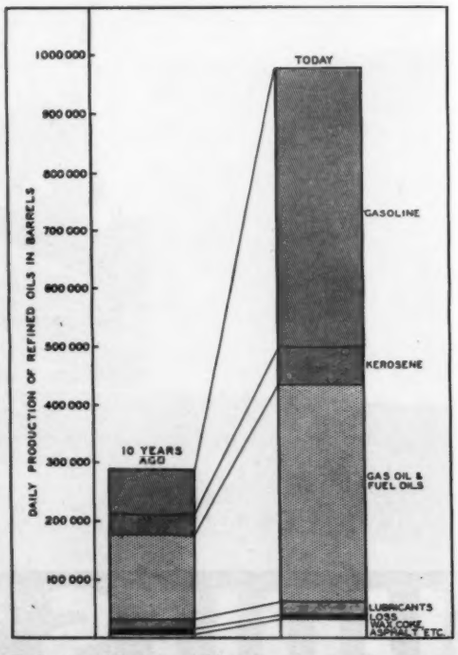
As a state Texas is probably better fortified with oil reserves than all others combined. Its 600 producing fields at present provide a large variety of crudes. The productive East Texas field supplies an unusually high antiknock straightrun gasoline.



Fractionating equipment recently installed in a new Texas Gulf Coast refinery in the Beaumont area



Refinery crude runs comparing Texas operations with those of the entire country. Note the growth in 15 years



Relationship of yields of refined oils among Texas refineries 10 years ago and today. Note large increase in total output in Texas

REFINERY CRUDE RUNS

(Average barrels daily)

	At present	1937	1933	1928	1923
Texas	979,440	979,260	597,640	509,800	283,220
Total United States	3,080,000	3,242,300	2,359,600	2,502,150	1,318,460
Per cent Texas of United States	31.8	30.2	25.4	20.4	21.5

while certain West Texas crudes are noted for their unusual lubricating-oil value. The crudes produced along the Gulf Coast are generally naphthenic, giving the local refineries an opportunity to blend the wax-laden West Texas crude with the naphthenic Gulf Coast oils to produce a wide range of special products.

In summarizing the position Texas holds as a refining state, it should be pointed out that 155 refineries are located there, out of a total of 562 in the United States. Texas refineries have a combined capacity of 1,326,865 bbls. of crude daily, or 29.4 per cent of the total capacity in this country. Of this total capacity, 1,241,150 bbls. is operating, leaving only 85,715 bbls. capacity idle.

More Than 30,000 Wells To Be Drilled In Texas

There are more than 30,000 wells yet to be drilled in the known proven fields of Texas according to a check made by pools covering the entire state. The total does not include several new areas, the extent of which are not known at this time. It also does not include the probable extensions to existing producing pools including new producing horizons which are constantly being found.

Editorial representatives of The Oil and Gas Journal who compiled a detailed report by fields estimated that at least 5,000 oil wells and 1,500 gas wells will be drilled in the known Panhandle producing areas. With 6,353 wells in West Texas; 6,650 wells in North Texas, and 810 wells in Central Texas pools, it is estimated that 8,000 wells will be required to complete drilling in the big East Texas field; 858 wells in East Central Texas pools; 533 wells in the pools of the San Antonio district and 729 wells in the pools of the Laredo-Government Wells district. The Upper Gulf Coast fields will require 838 wells and Lower Gulf Coast 535. Many new Gulf Coast pools are not included because information on them has not matured sufficiently to make it possible to obtain estimates. The total of wells to be drilled in the present known fields is 31,806, to which could be added the unestimated total of wells to be drilled in pools of recent origin.

Alberta Legislation on Conservation In Turner Valley Field

EDMONTON, Alberta.—Following arrangements for a modification of the agreement with the federal government whereby the natural resources of Alberta were turned over to the province in October, 1930, N. E. Tanner introduced in the Alberta legislature a bill paving the way for prevention of natural gas waste in the Turner Valley field. The bill gives the province the right to change agreements or leases, with compensation to any one who might suffer thereby.

Following adoption of this legislation, the government will, it is expected, issue regulations providing for gas conservation. Details of the proposed regulations have not been public, but they are expected to require the closing of wet gas-naphtha wells with a levy on crude producers and possibly other interests to compensate the naphtha producers.

Figures recently issued by the Alberta lands and mines department show a total output of 959,440,000,000 feet of gas from Turner Valley between 1925 and 1937, the period during which the Madison limestone has been productive. During the greater part of this period, a small proportion of this gas has been utilized in the field or for Canadian Western Natural Gas Co. system, the peak demand of the latter being around 55,000,000 feet a day. The remaining gas, after extraction of the naphtha, has been burned in flares.

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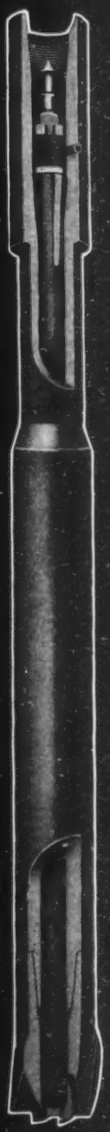

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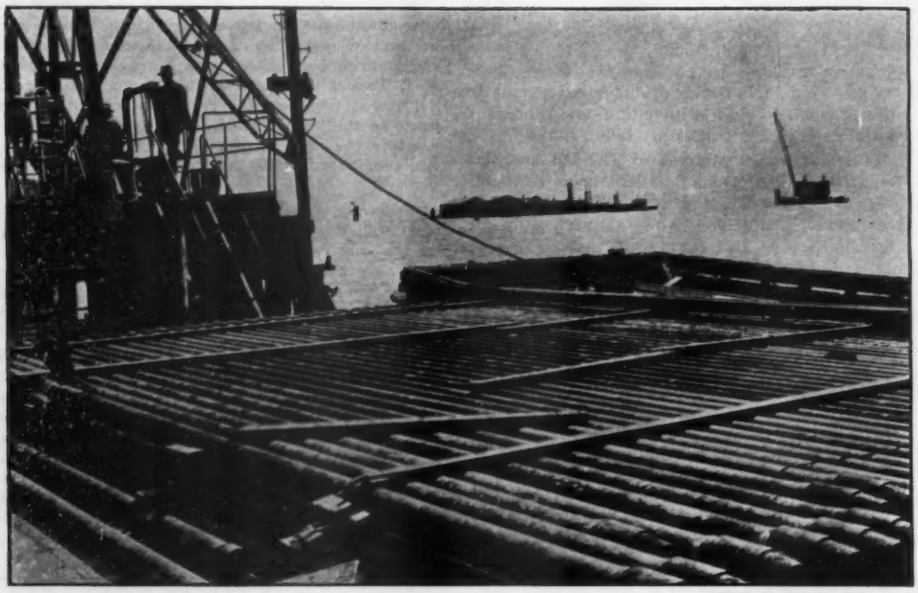


View from drilling barge in Galveston Bay, Texas Gulf Coast, showing, in background, rigging up for second well to be drilled by Standard Oil Co. of Texas and Salt Dome Oil Corp. in new Cedar Point field. Diesel-electric rig used in drilling discovery well (not shown) will be moved on when piling foundations are complete

Development of oil and gas fields believed to be located off shore in the Gulf of Mexico and in the various bays, inlets, and other tidal water bodies along the Texas Coast is assuming proportions of an active drilling play. Tidewater operations now are under way at a half dozen places on the Texas Coast. These will be augmented by water-bed drilling projects already planned.

These operations mark the first concerted attempt to exploit the productive potentialities of the Texas Coast's submerged areas. On the Louisiana Coast drilling of tidal water beds has been going on for many years, and important fields have been developed in them. On the Texas Coast, however, potentialities of land areas have been sufficient to occupy the attention of operators, and until now there has been no particular occasion to reach out into the more difficult submerged prospects.

At only two places has drilling of tidal water beds been undertaken on the Texas Coast previously. The old Goose Creek field extends into Tabbs Bay, one of the northern arms of Galveston Bay, and in the Turtle Creek field, on the marshy north bank of Turtle Bay, also an arm of Galveston Bay, two wells have been drilled off shore as offsets to land wells. The latter were drilled in 1935 by Stanolind Oil & Gas Co. The Goose Creek field was drilled in the earlier years of coastal history. Much of that portion of the field that now is in Tabbs Bay has been submerged since the field was developed due to a steady settling of the land.

Since the present development has been started, one tidewater field has been opened. Located over a mile off Cedar Point, Chambers County, in the north end of Galveston Bay, the discovery well, drilled jointly by Standard Oil Co. of Texas and Salt Dome Oil Corp., was completed February 12, this year. Drilled to a total depth of 6,030 feet, where it had 73 feet of sand, the well flowed initially at the rate of 22 bbls. an hour through a quarter-inch choke with a pressure of 960 pounds on the tubing.

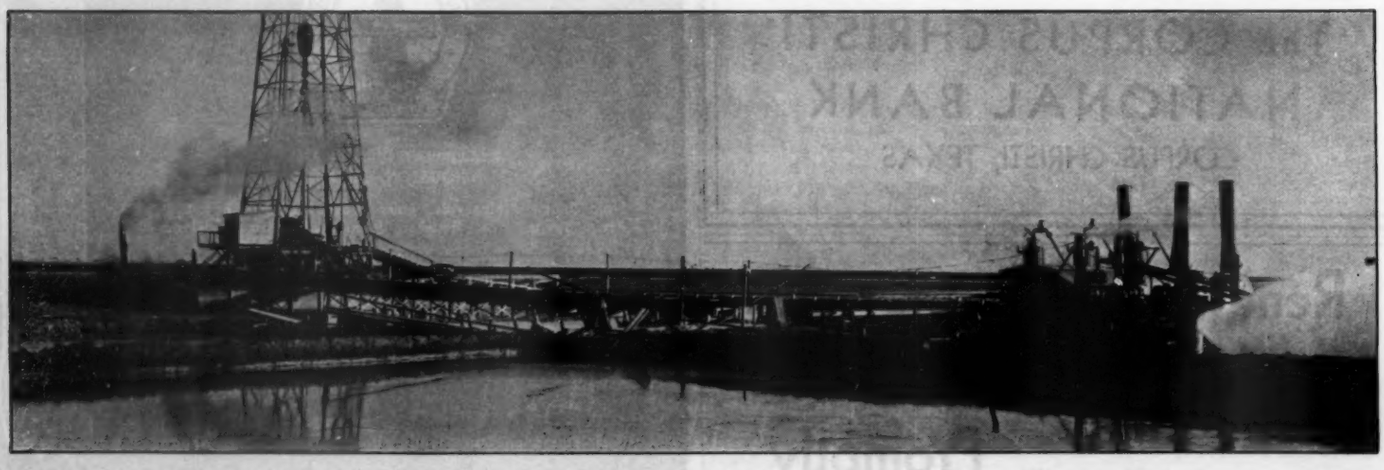
Completion of this well not only has occasioned the starting up of additional drilling to prove up the field, but also is an incentive for continued exploration for other fields that might be located in this bay or in other tidal water bodies along the Texas Coast. Since the well was brought in Humble Oil & Refining Co. has started drilling on a tract offsetting the well, and Standard Oil Co. of Texas and Salt Dome Oil Corp. have started rigging up for their second well. Permits also have been obtained by Humble for two other tests in the vicinity. This field is the first in Texas located entirely in water.

In addition to these wells, operations now under way in Texas tidal water locations include two in the Gulf of Mexico, off the Jefferson County shore; two in Red Fish Bay, off the coast of Aransas County, near Aransas; three in Laguna Madre, adjacent the Flour Bluff field, Nueces County, and another in Laguna Madre, a mile west of North Bird Island, about 10 miles down the coast from the Flour Bluff field, in Kleberg County. Although not entirely in open water, another active location is on the marshy north shore of Bolivar Peninsula, Galveston County, facing on East Bay (eastern extremity of Galveston Bay).

For the last-named test, Sun Oil Co. has dredged a channel from the Intercoastal Canal to move in equipment and supplies by boat. The prospect on which this test is being drilled is believed to extend out under East Bay. That bay, as well as practically all of Galveston Bay, of which it is a part, is under lease by various companies, and already Standard Oil Co. of Texas and Salt Dome Oil Corp., which jointly own a block of tracts in East Bay, off the shore of Bolivar Peninsula, have made application for permits to drill on 22 of these tracts.

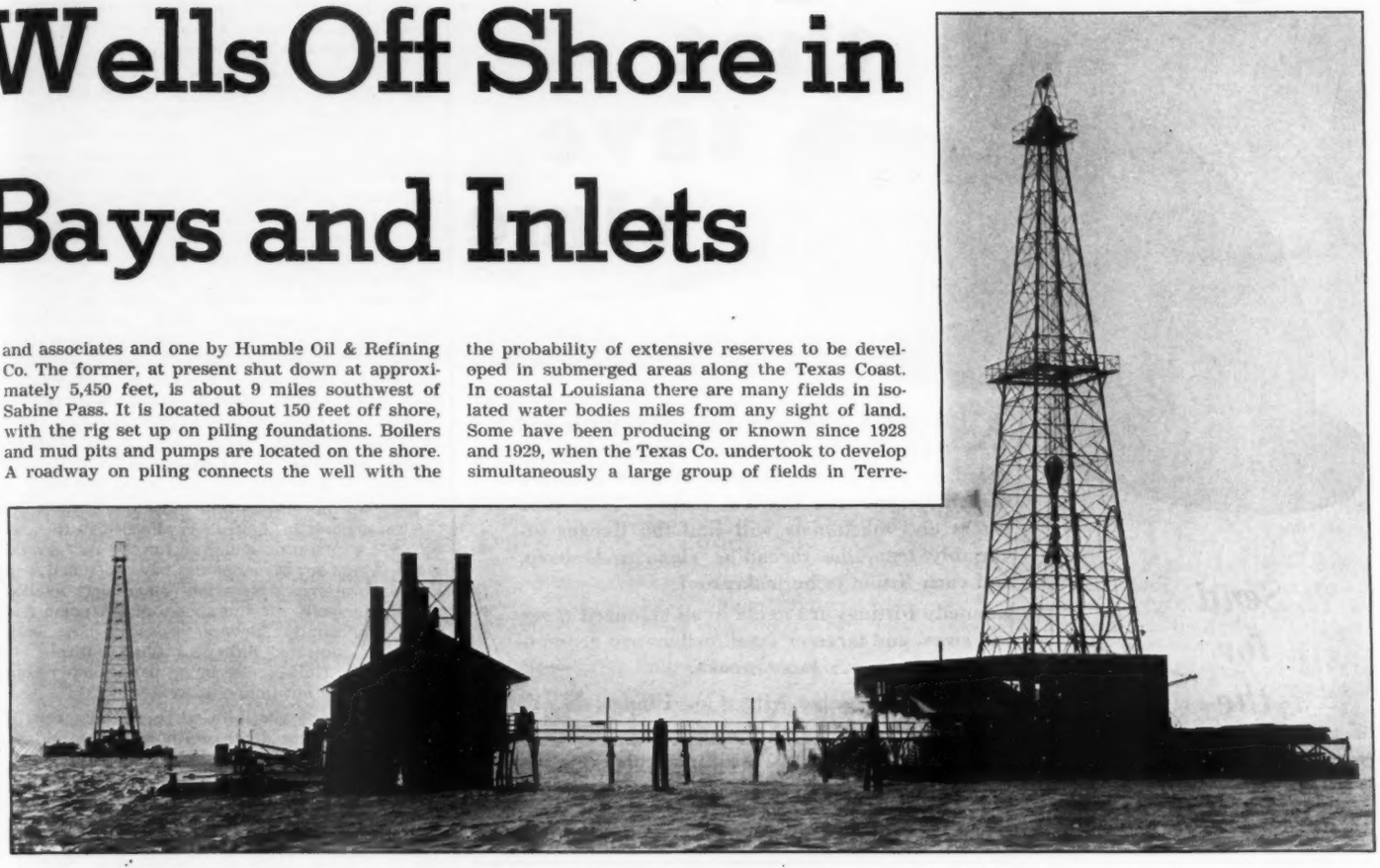
These companies probably will not attempt to drill on any of these tracts pending outcome of the Sun Oil Co. well. Permits have been asked to facilitate development should production to established, as under provisions of state leases governing such blocks, drilling is required to be started on a tract within 60 days from completion of a well within 1,000 feet of such a tract. In view of delays sometimes experienced in getting permits, it usually is advisable to request permits as early as possible. It is expected that several companies will apply for permits in groups for large numbers of tracts so that development can be facilitated should production be found on any of the tracts.

The two tests drilling in the Gulf of Mexico off the Jefferson County coast are one by I. E. Harwell



Drilling off shore to extend Flour Bluff field, Nueces County, Texas Gulf Coast, into Laguna Madre (Corpus Christi Bay.) Derrick and drilling equipment are located on artificial "island." Boilers, pumps and mud pits located on shore

Wells Off Shore in Bays and Inlets



Large drilling barge and boiler barge being used by Humble Oil & Refining Co. in new Cedar Point field, in Galveston Bay, Texas Gulf Coast. In background is discovery well drilled by Standard Oil of Texas and Salt Dome Oil Corp.

and associates and one by Humble Oil & Refining Co. The former, at present shut down at approximately 5,450 feet, is about 9 miles southwest of Sabine Pass. It is located about 150 feet off shore, with the rig set up on piling foundations. Boilers and mud pits and pumps are located on the shore. A roadway on piling connects the well with the shore. Due to the fact that the shore at this point is marshy, a plank road had to be laid to the beach road a quarter-mile back from the shore.

Humble's test is about 20 miles further down the coast. Its location is about three-quarters of a mile offshore. It also is being drilled from piling foundations, although access is by means of boats. A pier was built out to water deep enough for use of boats. This is a gasoline-engine rig.

Although no general development has been undertaken in tidal water bodies of the Texas Coast until recently, potentialities of these submerged areas for additional reserves long have been recognized. They constitute one of the Texas Coast's greatest prospects for new exploration and development. Including the strip of shore waters of the Gulf of Mexico out to the 3-mile limit, submerged areas of the Texas Coast embrace more than 2,000,000 acres, of which about 1,400,000 acres is represented by bays and small inlets and the remainder by the 3-mile strip of the Gulf. As shore lines are only variable surface features and subsurface formations are continuations of those of the present land portion of the coastal district, laid down under identical conditions with similar structural characteristics, it cannot be assumed that there are no fields under these water beds. If the density of fields is comparable to that on land immediately adjacent these water beds, the discovery of many important new fields can be expected.

In several places fields are located directly on the shore of tidal water bodies, or nearby. That some of these extend out under water has been indicated. One of these is Flour Bluff, Nueces County, where production has been extended to the shore of Laguna Madre (Corpus Christi Bay). All along the length of the Flour Bluff field, the water bed of Lagunda Madre has been leased for some time by various companies, and now three tests at offset locations off shore are drilling in Laguna Madre.

The numerous fields located in tidal water bodies of coastal Louisiana give further evidence of the probability of extensive reserves to be developed in submerged areas along the Texas Coast. In coastal Louisiana there are many fields in isolated water bodies miles from any sight of land. Some have been producing or known since 1928 and 1929, when the Texas Co. undertook to develop simultaneously a large group of fields in Terrebonne Bay and in adjacent tidal marsh lands which cover a large area of southeastern Louisiana along the Gulf of Mexico. One of these fields in particular (Caillou Island) is especially removed from any land, being located in the wide part of Terrebonne Bay, where the bay opens into the Gulf of Mexico. Within the last three months Gulf Oil Corp. has added Timbalier Bay and Quarantine Bay to the list of coastal Louisiana fields in tidal water locations, and within the past month Superior Oil Corp. and Pure Oil Co. brought in a wildcat producer located over 1¼ miles out in the open Gulf of Mexico off the coast of Cameron Parish, Louisiana.

That submerged potentialities of coastal Louisiana have been more extensively exploited than those of the Texas coast is due, no doubt, to a number of circumstances. In the first place, submerged areas of coastal Louisiana, in proportion to total area of the district, are of much greater extent than those of Texas. Thus in exploration for additional reserves in that district operators have had greater occasion to go into such locations. Also, inducements in the way of substantially higher production allowables per well have been more attractive for exploration and development of fields in submerged areas in coastal Louisiana than they have been in Texas. In view of the greated difficulties and higher costs of operating in water locations than on land, the higher allowables have been an important factor.

Opening by Superior Oil Co. and Pure Oil Co. of their new field in the Gulf of Mexico off the coast of Cameron Parish is creating additional in-

Fuel oil barge tied up at boiler barge used in drilling of well by Humble Oil & Refining Co., in new Cedar Point field, Galveston Bay, Texas Gulf Coast. Fuel barged from company's Baytown refinery

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terest in the possibilities of similar fields in the Gulf of Mexico along the Texas Coast. This field, the discovery well of which was completed in March, is only 30 miles up the coast from the Texas line. Conditions under which the well was drilled are the same all along the coast.

As for the possibilities of oil pools in the Gulf of Mexico, ample evidence has been given that such reservoirs do exist. Accounts, dating back to the logs and stories of early-day mariners, have recorded "oil ponds" at various places in the Gulf. The ponds are so definite and continuous in their appearance that they have been charted on the maps of mariners. The oil of these ponds is believed to have risen to the surface of the water as seepages from underlying petroleum entrapments. At some of these ponds there is a decided "boiling," or bubbling of oil, indicating gas pressure below.

Some of the ponds are many miles out from land and several even in the middle of the Gulf of Mexico. Naturally, any fields indicated by these are beyond the realm of exploration and development, even if international complications in connection with their ownership and operation could be settled. However, development of any fields indicated within territorial waters as far as 3 miles off shore is generally assumed to be feasible.

Further indication of the existence of fields off the Texas coast in the Gulf is afforded in the geophysical exploration going on for the last several years. A number of companies have been active in this exploration and have done some fairly detailed work principally off the shores of Jefferson and Galveston counties. Several prospects have been definitely indicated either as lying entirely off shore in the Gulf or else being partly under land and extending out under the water.

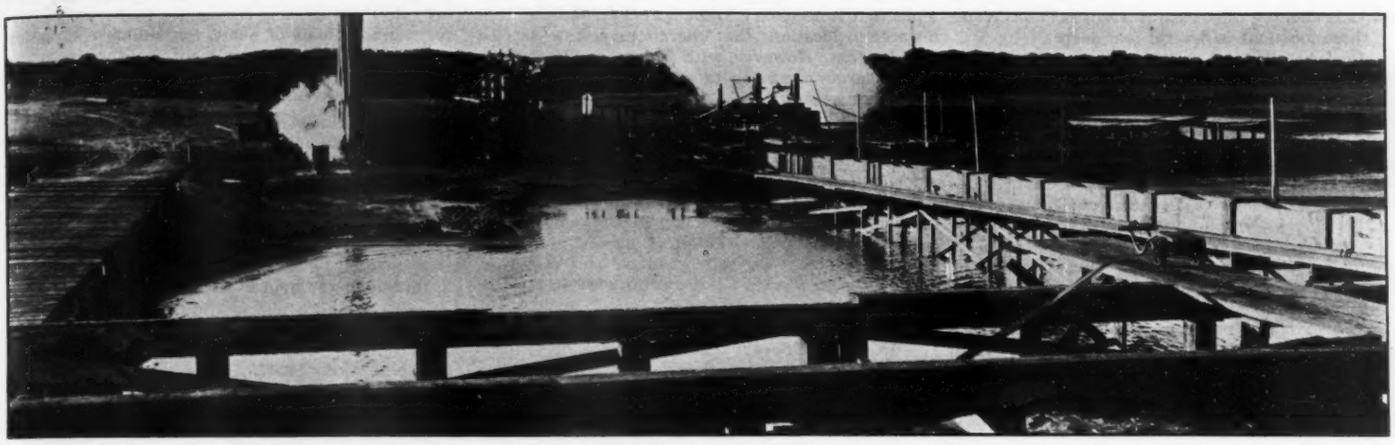
Within the 3-mile limit there are very few, if any, places where depth of the water would be considered excessive for development of oil fields. The continental shelf, like the coastal plain of which it is a continuation, dips off gradually, and out to about 3 miles depths below 25 to 30 feet ordinarily are not found. Such depths are not prohibitive of drilling. Along the Pacific Coast development is being done in 40 feet of water at some places, and no unconquerable difficulties are faced. On the Louisiana coast, development is going on in several fields located in water with depths as great as 15 feet, and there is no particular difference between operating in water of that depth and in depths of 25 to 40 feet.

Even beyond the 3-mile limit, out in the Gulf as far as 30 to 35 miles, depths usually do not exceed 10 fathoms (60 feet), and in many places within that limit the ocean floor rises to within 25 feet of the surface. Thus, even out that far depths are not prohibitive of drilling, though other factors may prevent development there. Only very thorough geophysical work could warrant development, due to the hazards and costs of wildcatting. The feasibility of geophysical exploration under such conditions naturally would be open to great question, although the suggestion has been made that such work could be carried on with the use of submarines.

The continental shelf, as disclosed by soundings by the Coast and Geodetic Survey, becomes more rough and broken 30 to 35 miles out. At the edge, about 90 miles from shore, depth is around 600 feet. There the floor drops off sharply, and within the next 25 miles a depth of 3,600 feet is reached. Twenty miles farther out a depth of 6,000 feet is recorded, and from there the sharp descent continues into the Silsbee deep of 12,000 feet.

Just off the edge of the continental shelf in that region of 2,400 to 3,600 feet of water, the topography is extremely uneven. Soundings reveal the features of mountain folds, fault scarps, anticlinal trends, and tectonic characteristics of particular interest to geologists, as the conditions have a bearing on possibilities of salt domes and other structures under the continental shelf closer to shore.

Within reasonable depths no problems are believed to be involved in carrying on operations in the Gulf of Mexico other than already have been faced in the development and production of fields located in tidal water bodies of coastal Louisiana, except the hazard of exposure to high tides and hurricanes that occasionally visit the Gulf Coast.



Drilling in Laguna Madre, Flour Bluff field, Nueces County, Texas Gulf Coast. View from derrick on artificial island shows boilers, pumps, and mud pits on shore. Mud ditch from well to mud pits on pier at right

Tidewater located fields on the Louisiana coast have weathered some severe storms, but for the most part the fields hit have been in semiprotected waters, where sand bars, or marshy islands located seaward between the field and the gulf, have broken the full force of the waves even though these bars and islands may have been submerged in the storm.

However, considerable damage can result from such storms and tides in any tidewater-located field, even in protected or semiprotected waters, unless proper precautions are taken to safeguard the wells. It is necessary that all structures in the water, both of drilling wells and producing wells, be of such construction as to meet such emergencies. Possibly the greatest hazard is to producing wells, in which wave-tossed timbers and debris might break well connections and result in the wells blowing wild.

This hazard has been eliminated by special valves and chokes which, placed in the bottom of wells, automatically close, shutting off production at the bottom, when anything occurs, such as breaking of the surface connections, to cause the well to start to produce above a set rate of flow. In the case of such producing wells the worst that could happen would be the losses incurred by damage to well connections and other surface equipment. As a precaution against this, it is the practice of operators in Louisiana tidewater fields to provide a heavy piling enclosure for all wells. Nothing short of some heavy boat or similar object against an enclosure of this kind could break it down.

Loss of drilling equipment in a storm would be a substantial item, but it is possible to provide structures that can withstand even the severest of the storms. There are lighthouses off the Florida Keys, where some of the fiercest hurricanes have hit, that are standing firmly after more than a century of use. Piling foundations, of adequate size and strongly driven, that permit free passage of waves through them, usually suffer no damage. Only when struck by some heavy object driven by high waves would any serious damage be likely. The heavy drilling barges which have been used in many operations on the Louisiana Gulf Coast also have proved equal to storm emergencies. With their large hulls full of water and resting on bottom of the water bed, they provide the securest of foundations.

Foundations being provided for drilling equipment used in tidewater operations are of varied types. Although drilling barges are being used extensively by various companies in the development of established fields, piling foundations generally are driven for deep exploratory tests, especially for those in new areas, at which test operations are expected to continue for comparatively long periods. Piling foundations are considerably more costly and involve a much greater time in getting set up, but it usually is not desirable to tie up barges for long periods. Barges are of greatest advantage in development of established fields in which saving of time and costs in moves from location to location is an important factor in proving up the field.

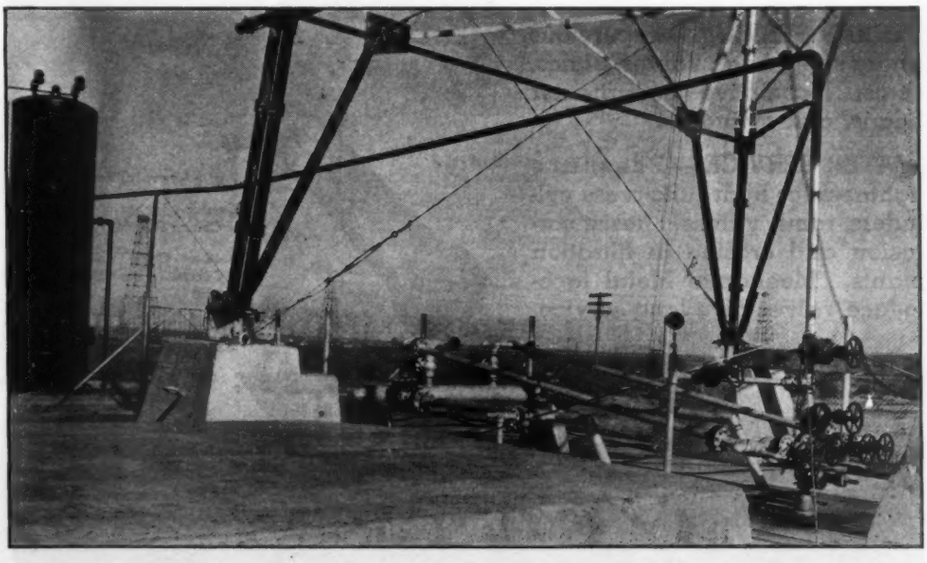
Piling foundations were provided for drilling Standard Oil Co. of Texas and Salt Dome Oil Corp.'s discovery well for coastal Texas' first tidewater field recently opened in the north end of Galveston Bay. With production established and with prospects of a large number of additional wells to be drilled in the immediate area, Humble Oil & Refining Co. moved in a large drilling barge from coastal Louisiana for development of its holdings. The former companies, however, will use piling foundations for their second test. This no doubt is due to the fact that these companies have done no previous development in water locations and do not have a barge drilling outfit. The discovery well was drilled under contract by Loffland Brothers, using a diesel-electric rig, and with this rig still on hand it is more advisable in this case to make use of it on the second test than to obtain a barge outfit.

For the wells drilling in the open Gulf of Mexico, heavy piling foundations are being used. With the establishment of production, it is possible that barges can be used in the shallower waters, but probably in the deeper water piling may be preferable. For such locations, "islands" may be built, from each of which by directional drilling, several wells may be drilled, thus minimizing the cost of setting up per well. It also is probable that at some places along the Gulf, close-in locations may be drilled by directional methods from rigs set upon shore.

On shallow water or marshy locations the edges of some of the tidal water bodies, matting foundations may find adaptation. Such foundations have been used frequently in the marshes of coastal Louisiana. On these, mats, consisting of heavy timbers, are laid, and then the rigs are set up either on conventional substructures, or on cribbing if the location is subject to overflow.

At Flour Bluff, where drilling is being extended into Laguna Madre, the three tests now drilling offshore are on artificial islands. These locations, one by Humble Oil & Refining Co. and two by Sinclair Prairie Oil Co., are approximately 200 feet offshore. The islands are about 200 feet square. For these islands retaining walls about 5 feet high, first were erected with heavy planks, and then filled in with sand and soil. Packed in, this forms a solid base. The islands are connected with shore by a roadway built in the same manner. As locations are made farther out, roadways probably will be extended and additional islands built.

Similar islands are being provided for two tests to be drilled in Red Fish Bay, Aransas County, one for Lincoln Oil Co. and the other for Coastline Oil Co. The latter is about 400 feet off Aransas Point.



High-pressure hook-up of one of the 3,000-pound Ordovician producers in the Big Lake field of Reagan County, western Texas. Twenty-six Ordovician producers have been completed in this field and to date accumulated production from this horizon has averaged over 1,000,000 bbls. per well, and they are all capable of flowing large potential flows today

about 2½ miles southeast of Aransas Pass. The other is about 4 miles east of Aransas Pass. Water of these locations is several feet deep.

For the offshore drilling now under way at Flour Bluff, boilers, mud-pumps, mud-pits and fuel and water tanks are set up on shore, with only the actual drilling equipment on the islands. The mud-ditch from the well to the mud-pits is erected on a pier. For tests further out from shore, large islands may have to be built to accommodate the facilities now located on shore. The water of Laguna Madre at this place is only a few inches deep, and should development reach out into much deeper water, piling foundations or drilling barges might be brought into use.

Shallow water frequently is a handicap to drilling operations in coastal water beds. Where operations are not close, or readily accessible to dry land, as at Flour Bluff, deep water is an advantage. When operations cannot be carried on directly offshore, shallow water limits the use of boats and barges in moving in equipment and materials. In such places it is necessary to dredge channels from deep water to locations that operations can be carried on by boat. However, with water 4 to 6 feet deep, most barges can be operated readily, even if loaded with equipment.

In the various bays along the Texas Coast, the depths generally range from 3 to 6 feet over a large part of the area. In very few places are there any depths below 8 feet, except in dredged ship channels. Around the shores of these bays the depths range down to flats of a few inches of water, as in much of Laguna Madre. That body of water which lies between the mainland and a line of islands from Nueces County southward to the Rio Grande River, seldom exceeds 2 feet in depth at normal tide.

In view of development operations carried on in water-located fields, fleets of boats are a necessary part of a company's transportation facilities. These include barges of various types, tugs, lug-gers, launches, service boats and speedboats. Not only do the operating companies find it necessary to maintain fleets of boats, but supply companies and "peddlers" of equipment now have boats of their own at base points to enable them to get around to the various water operations.

As far as actual drilling equipment is concerned, there is no particular difference between requirements of water jobs and those of land operations. Various types of rigs are used, including steam and mechanical rigs. In the Texas operations now under way, Humble Oil & Refining Co. is using steam on its test in the northern end of Galveston Bay, offsetting Standard Oil Co. of Texas' discovery well, which was drilled with a diesel-electric outfit. On Humble's test in the Gulf of Mexico is a gasoline rig, while I. E. Harwell's Gulf test, 20 miles up the coast, is a steam job. Steam rigs are in use at Flour Bluff. Fuel for Humble's test in northern Galveston Bay is fed from fuel barges which tie alongside the rig while drilling is under way. The power plant, like the drilling unit, is permanently mounted on a submersible barge. Mechanical rigs are particularly adaptable on remote and isolated wildcat operations. With the development of oil and gas production in water-located fields, gas can be used for fuel as is done in some instances in coastal Louisiana. There fuel lines are laid to the various wells on walkways which connect the wells.

The main difference between water and land drilling is that on water greater precautions must be taken, if possible, to prevent blowouts or other trouble. Extra large and heavy equipment must be provided, as well as adequate auxiliary facilities, to meet any emergency that might arise. Not only would a blowout on a water job be more difficult to kill, but, in the way of pollution of surrounding water, it could be more damaging than a blowout on a land well.

Prevention of pollution is a phase of operation that is receiving particular attention of those companies operating or planning to operate in tidal water locations. Special facilities, such as pans and drips, must be provided under rigs, tanks, connections, etc., for the collection of any oil or waste, to prevent its escape into the water. So careful are operators in this matter that it is possible for wells to be drilled, completed and produced without the escape of a drop of oil or waste.

More than 500,000 acres of tidal water beds are now under lease along the Texas Coast. Of this, approximately 325,000 acres is in Galveston and its associated bays, including Turtle and East bays. The remainder includes portions of Matagorda, Tres Palacios, Copana, St. Charles, Aransas, Red Fish, Carancahua, Baffin and Alazan bays, Laguna Madre, and various smaller inlets as well as the Gulf of Mexico at several places. Title to tidal water beds along the Texas Coast, including that of the Gulf of Mexico out to the 3-mile limit, is claimed by the state, and leases are obtained on sealed bids at public sales. For sales, all water beds desired to be leased are surveyed into as nearly uniform tracts as possible, considering irregular shore lines, and any or all companies or individuals have the privilege of bidding. Galveston and its associated bays have been under lease since 1935 and early 1936. In the three sales held since December 18, 1936, covering other waterbeds, a total of more than 190,000 acres has been leased.

In the geophysical exploration carried on in Galveston Bay during 1936 a large number of prospects, in addition to the one on which Standard Oil Co. of Texas recently established production, were located. Considering the area of Galveston and associated bays and the field density of the surrounding land there should be a half-dozen or more fields uncovered. Active geophysical work now is under way in Matagorda Bay out from Palacios. Exploration also has been made in the various bays further down the coast.

To drill in coastal water beds designated by the United States war department as "navigable" not only must permits be obtained from the state, but approval must be had from the war department for all structures that are to be erected. This makes the procedure of drilling in these waters a little more involved than that on land as sometimes long delays are incurred before war department engineers approve plans for structures.

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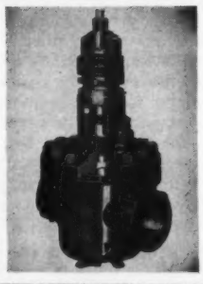

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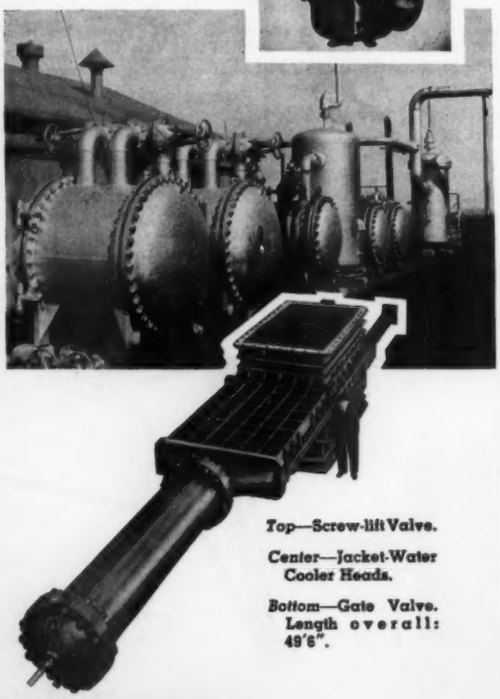

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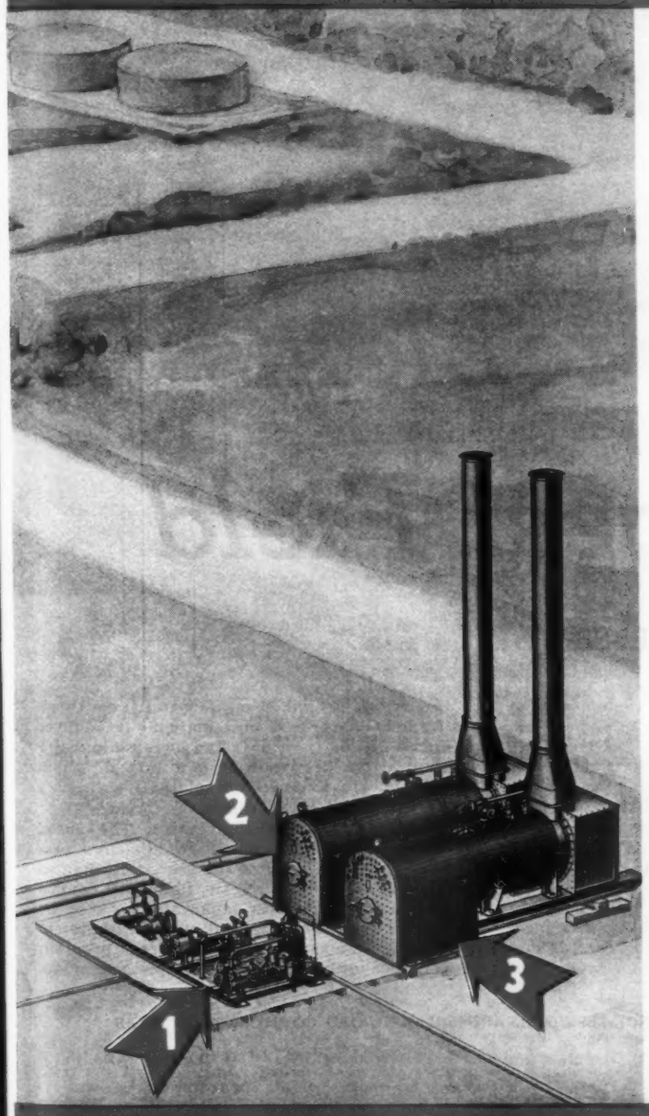

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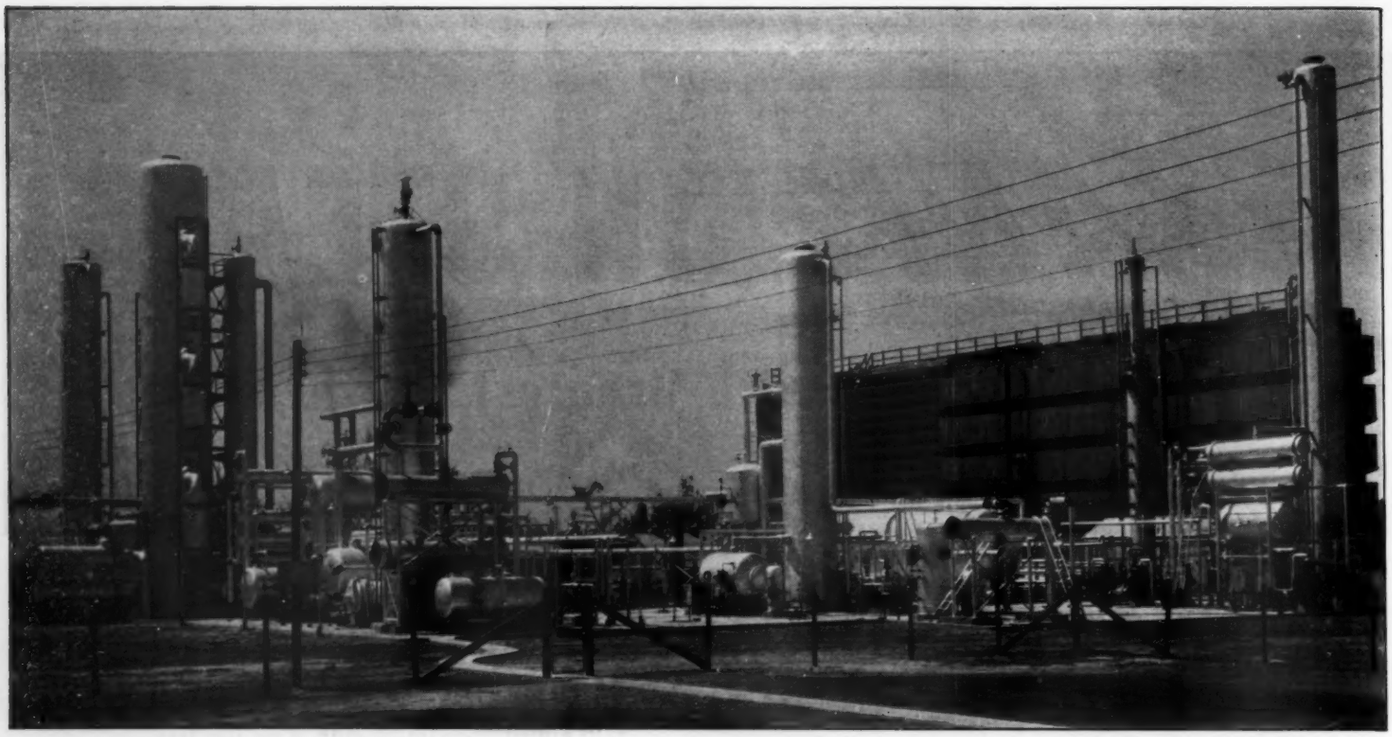

General view of Hanlon-Buchanan's natural gasoline plant in East Texas

Engineering Problems in World's Largest Field

By GEORGE WEBER

As production of the East Texas field moves it further along the course of declining reservoir pressures and advancing water encroachment, the engineering problems involved become daily more complex and difficult. While similar in character to the problems encountered in comparable fields, the difficulties faced in East Texas are of a magnitude never before approached.

By the end of April the East Texas field will have passed the 25,000-well mark. Daily production has reached 500,000 bbls. of oil and 100,000 bbls. of salt water. Five thousand wells are on the pump. Continued drilling adds nearly 200 new producers per month, and the density of wells in the field has reached 5.35 acres per well.

The conditions contributing to and resulting from the declining reservoir pressure and water influx, when applied to a field of this size assume primary importance, not only to East Texas producers, but to the industry at large.

That these changing conditions require the concerted effort of all operators in the field immensely complicates the application of sound engineering practices in regulating and combating them. Some of the phases have received considerable study and are well in hand. Others, due in part to lack of realization of their scope, and to differences of opinion on how to handle them, are in immediate need of attention. It is these problems, arising from the rapid increase in water withdrawal on the west side of the field, which present the greatest need of solution.

The extent of water influx on the west side of the field is illustrated in Figure 1. The dotted line indicates the eastern edge of the area producing water at the end of the year, according to surveys compiled by the Texas Railroad Commission. The first and most important work to be done in meeting the increasing water withdrawal problem is the adoption of a widespread program of well reconditioning. That this method of ap-

TABLE 1—BOTTOM-HOLE AND ALLOWABLE CHANGES IN THE EAST TEXAS FIELD—ENGINEERING DEPARTMENT, RAILROAD COMMISSION OF TEXAS

Date	Average pressure lbs./sq. in. at —3,300 ft.	Pressure change lbs. per million bbls.	Date	Allow. prod. for B.H.P. period	Daily avg. all prod. B.H.P. period	Calendar mo. allow. productn.	Daily avg. prod. per calendar month	No. wells as of first mo.	U.S. Bureau of Mines withdrawals in bbls.	Daily avg. U.S. B.M. withdrawals
1-12	1,176.47	+0.0872	Jan. (12-12 to 1-11 Inc.)	13,864,771	447,250	13,926,010	449,226	21,958	13,993,000	451,400
2-12	1,170.82	—0.405	Feb. (1-12 to 2-11 Inc.)	13,955,798	450,187	12,650,373	451,779	22,100	12,692,000	453,300
3-12	1,170.47	—0.026	Mar. (2-12 to 3-11 Inc.)	12,681,532	452,911	14,101,581	454,890	22,229	14,202,000	458,100
4-12	1,167.61	—0.202	Apr. (3-12 to 4-11 Inc.)	14,141,202	455,845	13,758,702	458,823	22,410	13,863,000	462,100
5-12	1,164.76	—0.207	May (4-12 to 5-11 Inc.)	13,789,483	459,649	14,295,808	461,155	22,596	14,514,000	468,200
6-12	1,163.26	—0.104	June (5-12 to 6-11 Inc.)	14,336,398	462,464	13,955,008	465,166	22,789	14,046,000	468,200
7-12	1,155.06	—0.585	July (6-12 to 7-11 Inc.)	13,999,013	466,634	14,549,606	469,342	22,994	14,685,000	473,200
8-12	1,141.35	—0.939	Aug. (7-12 to 8-11 Inc.)	14,599,035	470,936	14,683,388	473,658	23,201	14,947,000	482,200
9-12	1,131.33	—0.875	Sept. (8-12 to 9-11 Inc.)	14,730,918	475,191	14,347,436	478,247	23,418	14,501,000	483,400
10-12	1,118.56	—0.886	Oct. (9-12 to 10-11 Inc.)	14,397,337	479,911	14,949,229	482,200	23,656	15,489,000	486,700
11-8	1,130.93	+0.948	Nov. (10-12 to 11-7 Inc.)	13,042,523	483,056	13,592,669	485,452	23,841	13,786,000	459,500
12-8	1,131.20	+0.020	Dec. (11-8 to 12-7 Inc.)	13,133,093	437,771	14,207,405	458,303	24,066	14,355,000	463,100
1-8	1,119.98	—0.762	Jan. (12-8 to 1-7 Inc.)	14,725,467	475,015	14,313,252	471,716	24,269	14,426,000	465,000
2-8	1,127.06	+0.510	Feb. (1-8 to 2-7 Inc.)	13,835,837	446,962	11,905,659	425,202	24,456	.....	.....
3-8	1,123.24	—0.320	Mar. (2-8 to 3-7 Inc.)	11,929,320	426,047	.....	.....	24,627	.....	.....

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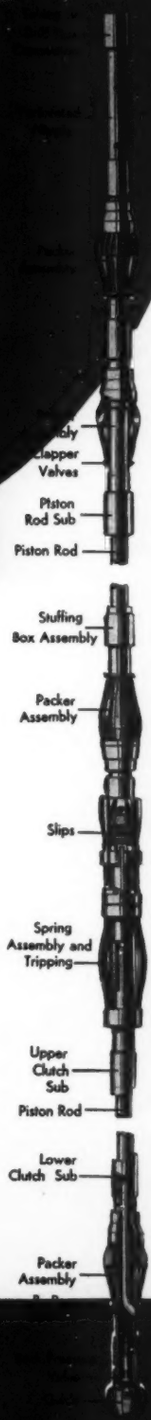

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proach will not bring required results in all cases does not detract from the importance of its application wherever there is a chance to reduce water withdrawals to a minimum.

At the present time many operators are experimenting with different methods of plugging back and squeezing water wells. Good results have been obtained in most cases, where sufficient oil sand is available in the wells to justify the added expense of reworking them. The volume of such plug back jobs to date, in comparison with the total number of wells making water is, however, insignificant. The need is for more attention to be paid to this first step in meeting the situation.

Secondary results of the water encroachment add to difficulties in producing properties on the west side of the field. Treating of emulsions, greater pumping loads, revision of new well completion practices and, finally, salt water disposal are demanding attention. It is important to note, however, that solution of these difficulties, with exception of well completions, does not in any way diminish their cause, but only corrects conditions arising from it.

Limits to Reworking

The economics of well reworking have tended to hinder a greater adoption of this program. Immediate benefits to be derived, and added returns on the investments are not obvious where production per well is limited to 20 bbls. per day for six days a week. However, the often overlooked fact that reworking of wells early in their water production history accrues benefits in reduced maintenance, increased recovery and longer flowing life should be seriously considered.

A number of cases where wells making over 90 per cent of water have been reworked successfully to produce pipe line oil should give good reason for increased adoption of such a program. If results have been far from perfect thus far, it is due to experimenting with various methods of plugging back and recementing in the early stages.

The relationship between volume of oil withdrawal and reservoir pressure has been the object of considerable study, particularly during 1937. Mechanism of the water drive, the balance between withdrawals and water influx and the response of reservoir pressure to changes in production have been thoroughly and competently studied.[1]

During the second half of 1937 the pressure decline accelerated at an alarming rate, as shown in Table 1. In order to study the pressure-production relation more thoroughly, the Texas Railroad Commission inaugurated a series of four Sunday shutdowns of the field beginning November 21. On each Sunday a bottom-hole pressure survey was made by commission engineers. Their results are shown in Table 2.

TABLE 2—BOTTOM-HOLE PRESSURES DURING THE 1937 SUNDAY SHUTDOWN PERIOD

Date—	No. wells checked	Average B.H.P.
November 21	91	1126.52
November 28	91	1124.14
December 5	90	1126.58
December 12	91	1128.64

The actual increase in bottom-hole pressure, as indicated by the results of tests made on the 91 index wells, was over 2 pounds. However the increase shown by the regular monthly survey was from 1,130.93 to 1,131.20 pounds, an increase of .20 pound. The discrepancy is explained by the fact that the four surveys during the experimental period were made while all wells were shut in, while the monthly surveys made on November 8 and December 8 were made while the field as a whole was producing.

Curtailment of oil production in East Texas to level off the pressure decline curve has been a major conservation move. The production of water has an influence on reservoir pressure identical to that of oil withdrawals. Its increase to a total of 20 per cent of the oil production brings it to a point where it should be recognized more fully. In Figure 2, the estimated water production, as reflected in the quarterly surveys made by the railroad commission since January 1, 1938, has been superimposed on the chart of oil production. Accuracy of the water data cannot be compared with that of oil withdrawals, but the general upward trend is clearly indicated.

It is the opinion of some engineers and geologists that the Sunday shutdown now in effect in the field need not be taken into consideration in appraising the effect of water production. The values plotted on the chart represent daily water production without regard to the one-seventh decrease reflected in the oil production figures. The behavior of wells on the west edge of the field, especially those producing large percentages of water, supports this assumption. Such wells, after having been shut in for one day, require the lifting of larger quantities of fluid following shutdown in order to regain their former oil-water ratio, and the effect of this increased water production tends to nullify the effect of the extra days production.

Engineering Progress

In all cases where reworking of water wells is considered, the importance of accurate well records has been evident. Ofter drillers' logs on wells completed at the height of the boom are not dependable and electrical surveys of the hole must be run. Some producers have had success in plugging back without use of high pressures and in leaving exposed only a thin section at the top of the oil sand. Others recommend the use of cement retainers and high pressures, recementing the section thoroughly and then drilling out to the top of the sand. Still others cement and perforate successfully downward until the top of the oil sand is reached.

All of the methods are undoubtedly superior in various wells, but the best treatment for wells in general is a matter of disagreement. A free exchange of information regarding this work is very valuable in combating the increasing water problem. The field for experimentation offered in East Texas and the large amount of such work to be done will probably result in the development of new reworking methods which will be of general interest in the industry.

The improvement to be gained in methods of plugging back will also result in impetus to the work in the field. All work of this type has been voluntary on the part of the operators. No moves

TABLE 3—TREND IN NUMBER OF WELLS MAKING WATER IN THE EAST TEXAS FIELD

Per cent water	1936 Jan. 1	1936 Apr. 1	1936 July 1	1936 Oct. 1	1937 Jan. 1	1937 Apr. 1	1937 Oct. 1	1938 Jan. 1	Est. daily water prod. 1/1/38 (bbls.)
0- 9.9	343	583	593	725	872	1,074	1,158	1,354	1,140
10-19.9	74	157	241	391	439	511	493	540	1,760
20-29.9	46	108	130	155	203	251	333	388	2,440
30-39.9	30	78	114	129	164	167	209	251	2,580
40-49.0	18	49	54	92	102	137	121	157	2,460
50-59.9	23	61	59	88	104	106	189	212	4,960
60-69.9	10	30	44	72	82	89	107	144	5,140
70-79.9	3	23	27	49	51	66	114	116	6,610
80-89.9	14	38	36	79	86	85	131	155	16,300
90-99.9	7	36	30	66	76	80	133	145	45,500
Total	568	1,163	1,328	1,846	2,179	2.566	2,988	3,462	88,890

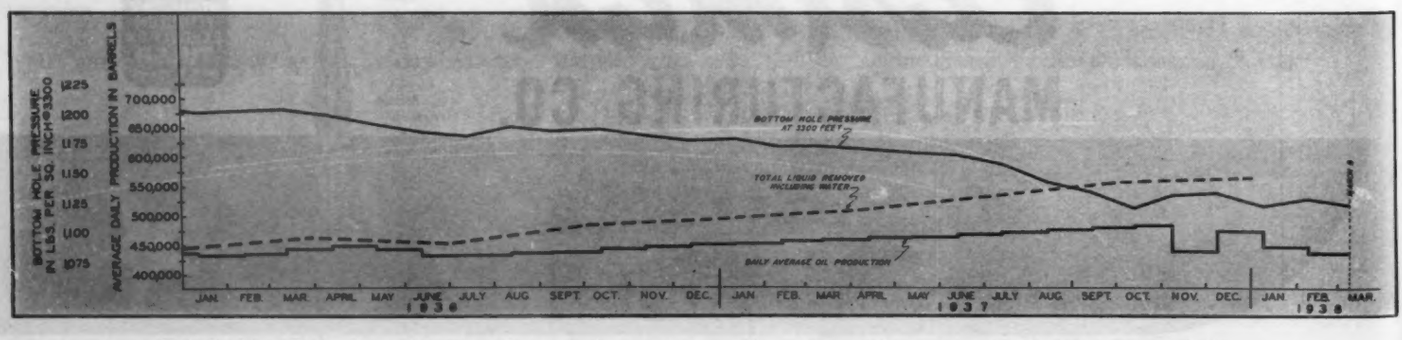

Fig. 2—Trend of oil production, bottom-hole pressure and total liquid recovery in the East Texas field

Talco field of Texas

have been made toward allocation of allowable withdrawals in the field on an oil plus water basis; although the accelerated increase in production of the latter may present it as a serious issue in the future.

Treating Emulsions

Advancing water in the field has brought the problem of treating emulsions to many operators for the first time in the past year. Here again, there has been some variance of opinion as to the best methods to be employed. Mechanical, heat and chemical dehydration have been used singly and in numerous combinations with good results.

Heating seems to be best adapted to the work from the standpoint of cost and results. Very few successful methods have been adopted which do not employ heating at some stage on the process.[2] Open steam injection, closed coil steam heating, direct heating in oil field boilers and passage of oil through a hot water layer in the settling tanks, comprise the accepted methods of heat treating.

Mechanical means of breaking emulsions in East Texas are restricted mainly to use of knock-out drums and settling tanks. The excelsior or hay tank, which finds wide usage in other East Texas fields, has not been adopted in this field to any extent, due to greater operating costs.

Heating of oil to break emulsions is carried out by most operators at temperatures of 120 to 130 degrees. This procedure strips a small fraction of the lighter constituents overhead in the casinghead gas. The enriched gas from leases where heat treating is practiced yields this fraction in added natural gasoline, and allowable oil production, if measured after treating, is increased slightly by removal of the light ends.

Widespread heat treating in parts of the field resulted in an order issued by the railroad commission prohibiting the heating of crude before measuring for allowable, excepting for removal of b.s. and water, and in such cases, temperatures were limited to 140 degrees.

In a survey made last October, the railroad commission found that those vapors which come off at 120 degrees would be lost anyhow before the crude could reach refineries. It was also revealed that treating temperatures of 160 degrees would increase the recovery of natural gasoline from the gas as high as 8 per cent. The commission found that a large percentage of operators heat treated crude after separation, that the gravity of the oil after treating averaged 38 degrees and above, and that 147 degrees of temperature is sometimes required to break the water emulsions. It was suggested at that time that the total fluid, including water be included in the allowable quota of wells in the field.

Progress in Pumping

In pumping an increasing number of wells, operators in the area already affected by water encroachment are working out programs best adapted to lifting additional fluid and keeping water production to a minimum. It has been proved in many cases that by prolonging the pumping time over as long a period as possible each day, less water is lifted. The slower rates of withdrawal allow the water at the bottom of the well to remain undisturbed by the working barrel, and the fluid higher in the well, containing more oil, is lifted.

As water production increases in some wells to a point where the pumping capacity of their equipment will not lift sufficient oil to justify operating expenses, these wells are expected to be abandoned. Plugging of such submarginal wells will have a marked effect in cutting water production, for it is the leases which produce over 90 per cent of water which are responsible in the largest part for growing withdrawals in the field.

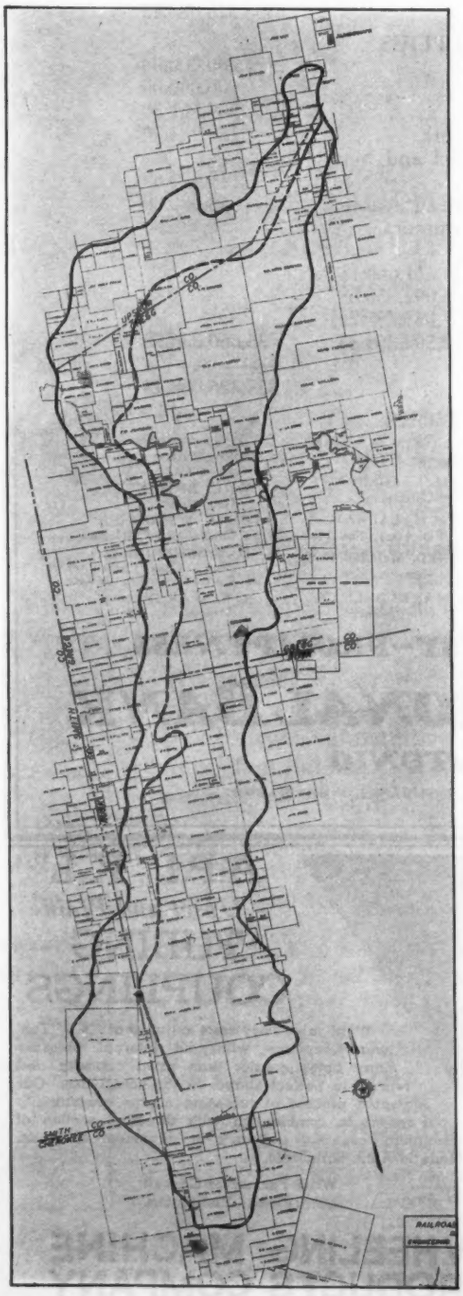

Fig. 1

Completion practices in East Texas still exert some influence on the amount of water withdrawal, and their correct revision in view of the water increase will have even more influence as the producing life of such wells lengthens. In the past, when wells were allowed to produce their potential, as much sand as possible was cored thus exposing the well to earlier water influx.

At present, however, especially in the townsite areas where development is concentrated, the practice is to take in as thin a section of the oil sand as possible. As little as 1 foot of oil sand is sufficient under present restricted allowables to produce a well. Most operators now set the oil string on top of the sand, then drill into the oil pay with a spudder taking in usually less than 3 feet.

In regard to well completions, the reverse circulation method of drilling out plugs is finding increased favor.[3] By drilling plugs with tubing string and through reversal of the fluid flow upward through the tubing, a better control is obtained on the operation. Increased velocity of the upward flow of drilling fluid affords faster and more accurate inspection of cuttings, thus allowing the operator to drill more exactly the correct amount of sand desired. Use of oil as a drilling fluid further increases chances for a better well, and this practice is finding increased adoption.

The danger of blowouts is now carefully controlled, particularly in townsite drilling. Operators are required to equip with blowout preventers and to maintain a sufficient head of oil, water or heavy mud in the hole to preclude loss of control.

Salt Water Disposal

The disposal of salt water and prevention of pollution of streams in the field is receiving the attention of the best authorities in that phase of work. The usual methods of disposal are widely used. In anticipation of greater amounts of water tto be handled in the future, some companies are experimenting with methods of returning the salt water to the lower Woodbine sand and to the Paluxy sand.

Increase in Water Wells

During 1937, production of Woodbine water in the field increased 60 per cent, and the total of wells making water increased equally. The addition of wells making water, and their progression to higher and higher percentages is illustrated in Table 3. Date is taken from surveys made at quarterly intervals by the railroad commission.

Throughout the two-year period, over half of the wells making salt water have remained in the lower brackets, i.e. those making less than 20 per cent of water. The value of the table in tracing water encroachment is not illustrated so much by the trend in number of wells as by the increase of the totals in the higher percentage brackets.

For the breakdown of the January 1, 1938, survey, it was assumed that the wells in each 10 per cent classification would produce an average of 1 per cent less than the median of the 10-point spread. Thus the average of wells in the 0-9.9 per cent group was assumed as 4 per cent, that in the 10-19.9 per cent group, 14 per cent, etc. On this basis, the daily salt water production by wells in each group was calculated using 20 bbls. of oil as the base allowable.

It is important to note that on this assumption, over half of the total daily withdrawal is produced

STATEMENT OF CONDITION

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To The Comptroller of Currency

AT THE CLOSE OF BUSINESS MONDAY, MARCH 7, 1938

RESOURCES

Cash		$12,416,712.55
U. S. Government Obligations (all carried at par or less)		17,228,906.25
Investment Bonds and Municipal Obligations (all carried at par or less)		2,975,088.00
Stocks in Federal Reserve Bank		63,000.00
Loans and Discounts		4,495,074.89
Interest Earned but Not Collected		130,729.93
Building Account		1,008,140.81
Other Real Estate Owned		1.00
Customers' Liability Account Acceptances		8,435.00
Total		$38,326,088.43

LIABILITIES

Capital Stock		$ 1,200,000.00
Surplus		900,000.00
Undivided Profits		339,561.30
Reserved for Taxes, Interest, etc.		150,983.90
Interest and Discount Collected and Not Earned		18,871.68
Dividends Declared but Not Yet Payable		48,000.00
Acceptances Executed for Customers		8,435.00
Deposits:		
Commercial	$20,111,660.11	
Correspondent Banks	5,092,556.88	
Time	7,951,755.23	
Public Funds	2,504,264.33	35,660,236.55
Total		$38,326,088.43

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in the 145 wells in the 90-99.0 per cent group, while that group represents only 4.2 per cent of the total number of water-producing wells. Likewise, 22.2 per cent of the wells, which produced 50 per cent of salt water and over accounted for salt water withdrawals in excess of 88 per cent of the total.

These production figures, while theoretical, are sufficiently representative of the actual conditions to illustrate that the bulk of water production comes from a few wells. Reworking of wells in this high production group is probably not feasible in most cases, for they are close to the submarginal stage, and their plugging is imminent. In the total picture of oil and water withdrawals and their relation to reservoir pressure, the effect of 145 wells causing withdrawals of over 55,000 bbls. per day of oil and water; over 9 per cent of the total volume produced by 25,000 wells, is worthy of consideration.

In the theoretical calculation of production, the total is somewhat higher than the 85,133 bbls. reported as actually produced by the water wells. The discrepancy is probably greatest in the lowest 10 per cent group, where many wells were making only traces of water. Authoritative estimates placed water production in March at 100,000 bbls. daily.

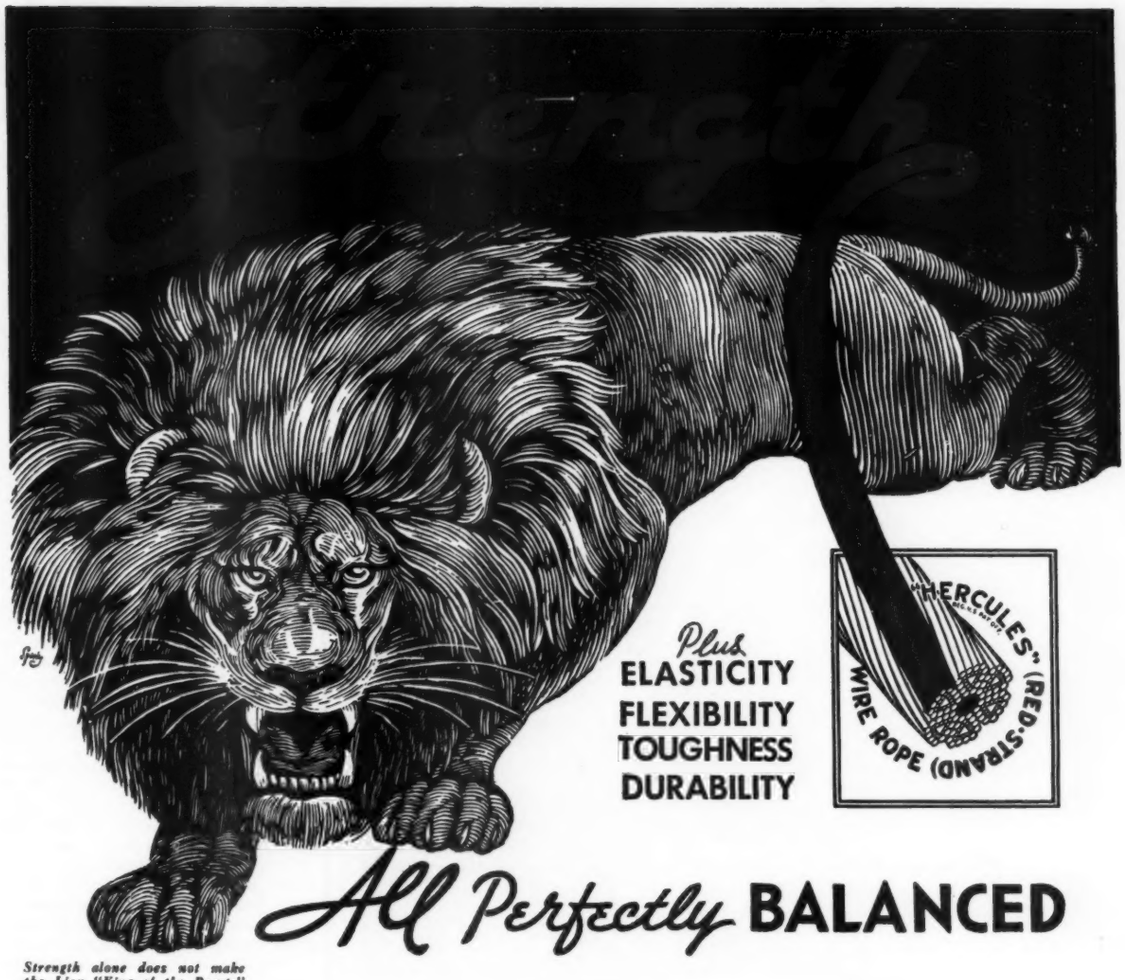
In a recent paper presented before the American Petroleum Institute, Stuart E. Buckley, of Humble Oil & Refining Co., states: "Should the future rate of increase (of salt water production) follow the same trend, then the entire benefits to be obtained through restricted rates of oil production are in danger of being obliterated during the next two years." In discussing the effect of future salt water production as indicated by the present rate, he states: "It is indicated that the supposed increased rate of water production would lower the pressure more in the next two years than the oil production alone would lower it during the remainder of the life of the field."

Future Trends

Whether or not the present trend in water withdrawal will continue at the same rate is a matter of conjecture. The expedience of corrective measures for the present, however, are not dependent on the probable future developments.

It is the opinion of Hudnall & Pirtle, geologists of Tyler, Tex., that the water production curve will show some flattening within the next few years. They point to the estimated 1,500 to 1,600 submarginal wells in the field at the present time, most of which are making water in large

Cementing casing on deep Gulf Coast well



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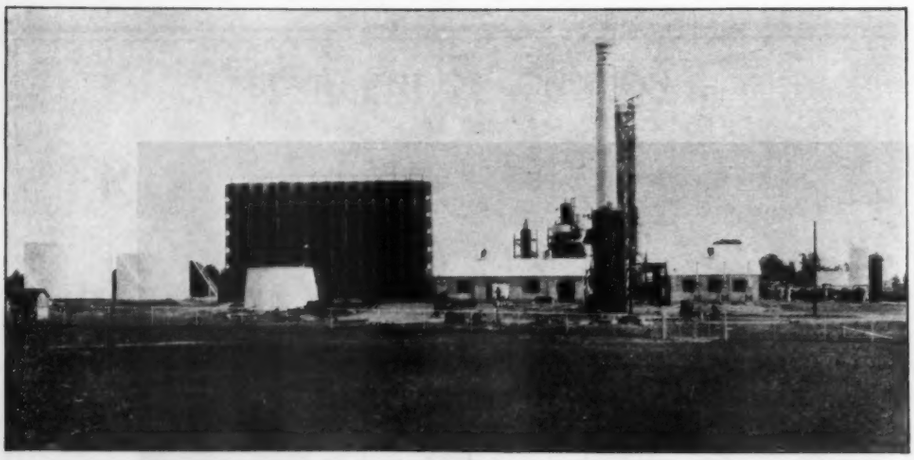


Premier Oil & Refining Company's plant at Longview in the East Texas field

quantities and are due for abandonment in the near future. It is evident the plugging of a few wells in the 90 per cent class will have a marked effect on total water production.

As to rates of abandonment, Hudnall & Pirtle have completed a survey which is interesting in its application to East Texas. For a basis upon which to work in estimating the probable trend in plugging East Texas wells they have looked at older Woodbine fields. Their findings are illustrated in Table 4.

TABLE 4—RATES OF ABANDONMENT IN OLD WOODBINE FIELDS

Fields—	Per cent total estimated reserve produced	Per cent total wells abandoned
Powell	85	10
	90	50
	92	75
Mexia	77 5	10
	91	20
	93 5	50
Wortham	74	10
	81 6	20
	95	50

It is to be noted that the above fields were produced without restrictions such as are now in force in East Texas. Water encroachment was rapid and coning common. The total reserves of the East Texas field are placed between 3,500,000,000 and 4,000,000,000 bbls. Of that total 1,200,000,000 bbls. or 32 per cent has been produced to date. It is their opinion the field can produce at the present rate of 180,000,000 bbls. annually for the next eight years. At the end of five of these years, according to assumption, the field will have produced 900,000,000 bbls. more of oil, and the aggregate production will be 2,100,000,000 bbls., or 60 per cent of the total estimated reserves. By the end of the eight-year period the total cumulative production will have reached 1,660,000,000 bbls. or 70 per cent of the total at the estimated rate. According to the history of older Woodbine fields, when the field has produced 75 per cent of its reserves, approximately 10 per cent of its wells will be abandoned.

New completions at the present time average nearly 200 wells per month. At the beginning of 1938 there were about 24,250 wells in East Texas. At the estimated rate of 2,000 new wells during 1938, 1,500 during 1939, 1,000 in 1940 and a total of 1,250 during the following three years, 30,000 wells will have to be drilled in the field by January 1, 1944. However, the rate of abandonment will increase, and approximately 3,000 will have been plugged by that date.

Based on this broad assumption, and the history of older Woodbine fields, it is the opinion of Hudnall & Pirtle the total number of active producing wells in the field will never reach 30,000 but probably about 28,000 and not less than 27,000.

The great percentage of wells now being drilled are those of independent operators, and drilling up of many leases is anticipated in the next year. It is possible the drilling rates for new wells as outlined above are excessive, but they are presented merely as a matter of conjecture. The rates of abandonment as shown by older fields may apply closely to East Texas, provided no regulation of water production is inaugurated. Scheduling of production allowables on a total withdrawal basis would greatly affect the abandonment rates in East Texas, and in turn, the trend in water production.

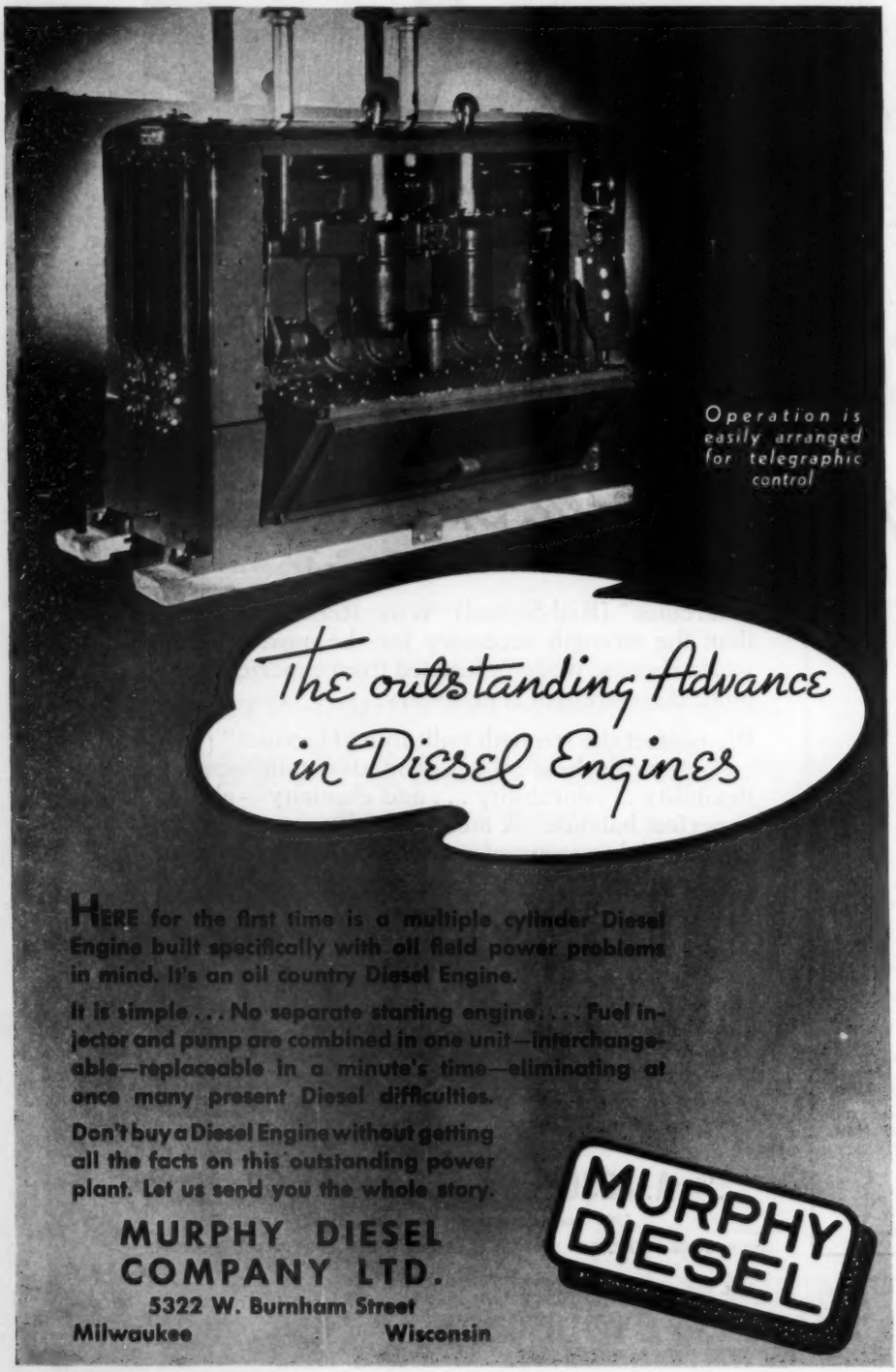
[1]"The Pressure Production Relationship in the East Texas Field," by Stuart E. Buckley, Humble Oil & Refining Co., presented before the A.P.I. at Dallas. The Oil and Gas Journal, April 7, 1938.

[2]"Treatment of Oil Field Emulsions in East Texas," by B. M. Givens, Sun Oil Co. The Oil and Gas Journal, page 65, February 17, 1938.

[3]"Completing Wells by Reverse Circulation in East Texas," by F. G. Beckman, Beckman, Inc., The Oil and Gas Journal, page 45, March 10, 1938.

Monthly Map Service

Zingery Oil Map Co., of Fort Worth, is now offering a monthly service, in map form, of all wildcat drilling data in the entire State of Texas and eastern New Mexico. Locations of all wildcats announced, all wildcat wells drilling, names of operator and farm, and list of wildcat completions for the preceding month, are brought up to date each 30 days. This information is superimposed upon an index map of the area and provides a quick picture of just where the present exploration is being done, and shows the relation of all wildcat wells to present producing oil or gas fields.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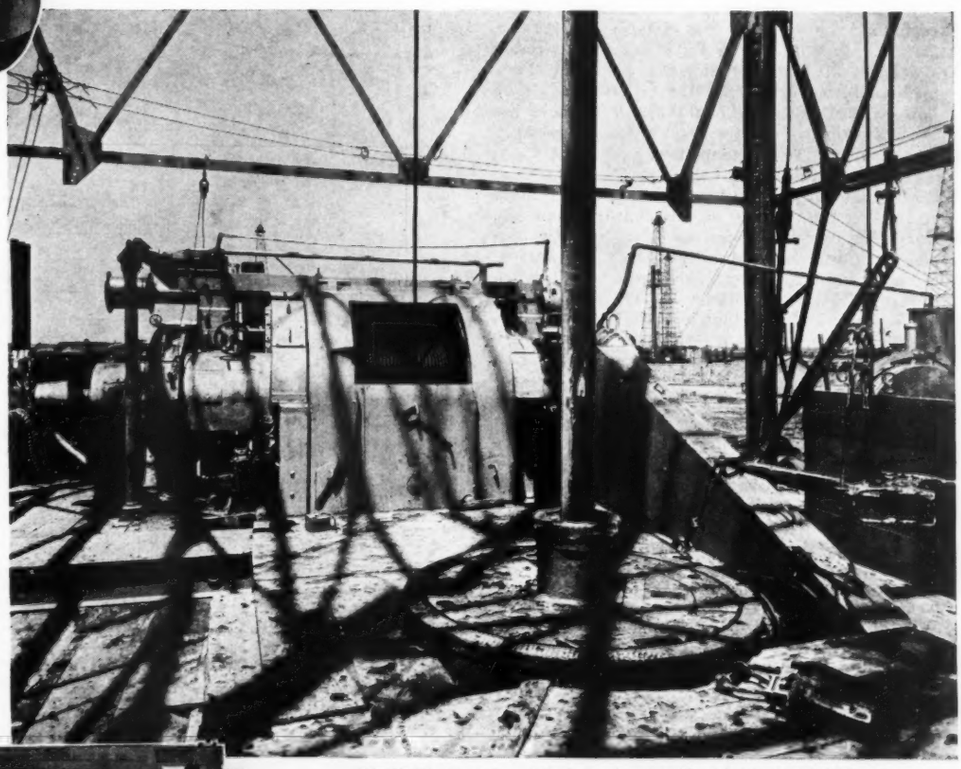
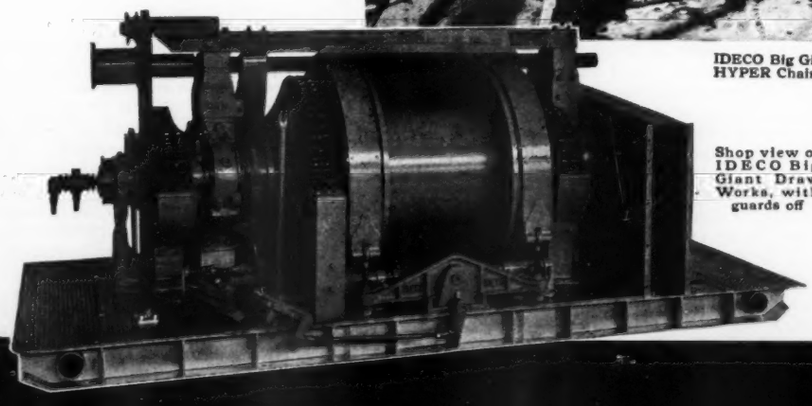
● Recent completion of the sixth well in the Jennings, La., 7,800′ pay by W. T. Burton Drilling Company, with their IDECO Big Giant Draw Works, is further approval from the field of LINK-BELT SS-3125 HYPER Rotary Chain. In 360 days of service, totaling 46,000 feet of hole, there was not a single chain break or replacement. This highly engineered chain, with far greater strength, durability and safety factors than any other short pitch rotary chain ever offered the oil fields, has an ultimate strength of 230,000 pounds in the double width type used on this drilling. Operating on cut tooth sprockets and continuously lubricated by the enclosed "Pressure Spray" system provided by IDECO'S Big Giant Draw Works materially added to the fine performance of the chain on these high speed drilling jobs.

This performance is not an exceptional case. Numerous other jobs using LINK-BELT SS-3125 HYPER Chain on similar draw works are all showing equally good results.

Link-Belt Company, Indianapolis, Chicago, Philadelphia, Los Angeles, New York, Houston, Dallas or Tulsa. 7328



IDECO Big Giant Draw Works, equipped 100% with LINK-BELT SS-3125 HYPER Chain, on W. T. Burton Drilling Company location, Jennings, La.



Shop view of IDECO Big Giant Draw Works, with guards off

LINK-BELT'S Houston office will furnish information on this new, but proven chain, and quote prices on double width chain drive from engine to draw works. Folder No. 1525 carries full details on both Double and Single Width SS-3125 HYPER Chain. Ask for your copy.

LINK-BELT CHAINS

SURPASSES RECORDS

(Continued from Page 77)

Spindletop was important not only because of its huge daily production of oil, but also because many of the men who have later attained national and international fame in the oil industry entered it there. It also successfully demonstrated the possibilities of the rotary rig, a most important factor in early Gulf Coast drilling.

Following the discovery and early development at Spindletop came additional salt dome fields in Southeast Texas, the construction of pipe lines and refineries in that area, and the first shipping of oil by a tanker from a Texas port; and by the the end of 1903 the total storage facilities in that area were reported to be 19,226,800 bbls. It was estimated that the total capital invested in the Beaumont district by the end of 1901 was $3,951,-085, and at the end of 1904 it was estimated to be $34,036,500.

In 1904 attention was directed to a different sector of the state. Although a few small wells had previously been completed there, the Petrolia field in Clay County is generally considered to have been discovered that year. Its total production for the year was 65,445 bbls. of oil secured from sands at a depth of approximately 300 feet. North Texas was now included among the producing areas of the state.

Discovery and development of oil fields was more or less general during the next decade and resulted in such important areas as Sour Lake, Batson, Humble, North Dayton, Electra, Goose Creek, Markham, Orange, Mission, Somerset, Burkburnett, Iowa Park, and many others. This development resulted in the beginning in Texas of the present extensive oil pipe line systems of the Gulf, Magnolia, and Texas companies.

In the meantime the development and utilization of natural gas had been making rather rapid strides. At the opening of this century some gas was being consumed for lease and domestic purposes at Corsicana, and in 1903 the total value of the gas thus utilized by 78 domestic and 8 industrial consumers was placed at $21,351. This gas was transported and distributed through a total of 28 miles of pipe line in or adjacent to the field. Indications of the coming importance of this branch of the industry were to be noted with the completion of a good gas well in the Petrolia field in September, 1907, and the subsequent completion of three more gas wells in that field. The production from these wells was piped to Henrietta and Wichita Falls for distribution and consumption. In the following year a gas well was completed east of Laredo, the forerunner of a later great development; and a gas well east of Tilden, also in Southwest Texas, blew out and was not controlled for several years.

The year 1909 proved one of great activity in the natural gas industry. Spurred on by the successful results secured by pipe line transportation of gas from Petrolia, preparations were made to transport it to Fort Worth and Dallas, the beginning of the extensive Lone Star system. Continued expansion followed and by 1914 Petrolia was supplying gas to 24 cities and towns in northern Texas. Cities and towns in other areas were being supplied with gas from Mexia, Corsicana, Moran, Reiser, and other fields; and a serious blowout and crater had resulted from development at White Point.

The search for new fields was steadily advancing beyond the limits of areas already proven, and in February, 1915, Thrall was discovered. This field not only directed attention to what is now classed as Southwest Texas; it also proved the existence of oil in serpentine, and wildcatters began seeking such altered igneous intrusives.

In the years immediately following the discovery of Thrall, successive discoveries attracted first to one area and then to another. The first to claim attention was Ranger in October, 1917. Favorable indications had already been given by a test of Texas Co. and one of Texas Pacific Coal Co., but it remained for the McClesky well of the latter company to touch off a most intensive drilling campaign. The Ranger field produced more than 22,000,000 bbls. of oil in 1919.

Following Ranger came Burkburnett townsite in July, 1918; Desdemona and South Bend and the development of Breckenridge in 1919; Mexia in 1920; Currie in 1921; and many other pools of lesser importance in North and East Central Texas. Discoveries in other areas of the state during this period included gas in 1918 and oil in 1921 in the Panhandle; the Mirando area in 1921; several Gulf Coast fields, including Hull and West Columbia; and the Westbrook field of West Texas. Commercial production of oil and gas had now been established in all of the present major producing districts of the Lone Star State.

The five years 1917 to 1921 inclusive were exceptionally important ones. About 40 new productive areas were discovered. Operators were confronted with the ever important question of price for crude oil as well as with the problem of labor troubles. Facilities for the transportation, refining, and marketing of oil were expanded by leaps and bounds; and although the industry was faced during a part of this time with a serious overproduction, drilling continued actively.

Of particular significance during these five years was the organization of the Oil and Gas division of the Railroad Commission of Texas on June 18, 1919, under the pipe line and conservation acts. This division was charged with general supervision of operations in drilling, such as setting casing, sealing off water, sealing off upper strata, plugging wells, and every detail of the process necessary to proper drilling; checking storage and pipe line facilities; inspection of oil and gas transportation and distribution lines; the elimination of fire hazards and other deterrents to conservation; and the exercise of a general supervisory control over oil and gas prospecting, transportation and rates. The work of completely organizing the division was practically completed during the year 1919-1920. During that period the commission held many hearings to provide procedure and to promulgate rules and regulations for the government of the division, leading to an effective administration of the law. Early attention was given to the prevention of fire hazard—the loss to the industry by fire alone during 1920 having been reported as being $1,465,468—the serious menace of water in the completion of wells, and other problems of vital importance to the industry.

What is known as the "Cox gas bill" was en-

GEOLOGIC FORMATIONS AND COUNTIES IN WHICH THEY ARE NOW PRODUCING

Pliocene			Undifferentiated	Brazoria, Chambers, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Matagorda.
Miocene			Undifferentiated	Austin, Brazoria, Brooks, Chambers, Fort Bend, Galveston, Hardin, Harris, Jefferson, Kleberg, Liberty, Live Oak, Matagorda, Nueces, Orange, Refugio, San Patricio, Victoria, Washington.
Oligocene		Middle		Aransas, Brazoria, Calhoun, Fort Bend, Galveston, Hardin, Harris, Jefferson, Jim Wells, Liberty, Matagorda, Nueces, Orange, Refugio, San Patricio, Victoria, Wharton.
		Frio		Brazoria, Calhoun, Chambers, Colorado, Fort Bend, Galveston, Hardin, Harris, Hidalgo, Jackson, Jefferson, Jim Wells, Live Oak, Matagorda, Nueces, Orange, Refugio, San Patricio, Starr, Victoria, Waller, Wharton, Willacy.
Eocene		Jackson	Whitsett	Austin, Bee, Duval, Harris, Jim Hogg, Liberty, McMullen, Webb.
			McElroy	Austin, Bee, Duval, Jim Hogg, Live Oak, McMullen, Polk, Starr, Webb, Zapata.
		Yegua	Cockfield	Austin, Bee, Colorado, Duval, Fort Bend, Goliad, Hardin, Harris, Jasper, Jim Hogg, Karnes, Liberty, Live Oak, McMullen, Montgomery, Polk, Tyler, Waller, Webb.
			Saline Bayou	Bee, Goliad, Hardin, Harris, Liberty, Live Oak, Montgomery, Waller, Webb.
		Claiborne	Cook Mountain	Angelina, Harris, Houston, Washington.
			Mount Selman	Harris, Houston, Nacogdoches, Starr, Tyler, Washington, Webb, Zapata.
		Sabine	Wilcox	Washington.
			Midway	Bexar, Milam.
Cretaceous		Upper	Navarro-Escondido	Atascosa, Bexar, Caldwell, Frio, Limestone, Milam, Navarro, Panola, Zavalla.
			Taylor-Anacacho	Atascosa, Bexar, Caldwell, Gonzales, Guadalupe, Limestone, Navarro.
			Austin	Bexar, Caldwell, Frio, Guadalupe.
			Eagle Ford	Maverick, Panola, Shelby.
			Woodbine	Anderson, Cherokee, Freestone, Gregg, Henderson, Houston, Leon, Limestone, Marion, Navarro, Rusk, Smith, Upshur, Van Zandt.
Cretaceous	Lower	Washita	Buda	Caldwell, Falls, Frio.
			Georgetown	Falls, Frio, Panola.
		Fredericksburg	Edwards	Caldwell, Guadalupe, Frio.
		Trinity	Paluxy	Franklin, Grayson, Hopkins, Titus.
			Glen Rose	Cass, Marion, Maverick, Panola, Shelby.
Jurassic				Yates.
Permian			Undifferentiated	Andrews, Carson, Clay, Cochran, Crane, Crockett, Dawson, Ector, Gaines, Garza, Glasscock, Gray, Hartley, Howard, Hutchinson, Irion, Loving, Mitchell, Moore, Pecos, Potter, Reagan, Scurry, Upton, Ward, Wheeler, Wichita, Wilbarger, Winkler, Yoakum.
Pennsylvanian			Undifferentiated	Carson, Gray, Hutchinson, Kendall, Kerr, Moore, Potter, Wheeler.
			Cisco Canyon Strawn	Archer, Baylor, Brown, Callahan, Clay, Coleman, Comanche, Cooke, Eastland, Erath, Fisher, Foard, Haskell, Jack, Jones, Montague, Palo Pinto, Runnels, Shackelford, Stephens, Taylor, Throckmorton, Wichita, Wilbarger, Young.
			Bend	Brown, Coleman, Eastland, Palo Pinto, Shackelford, Stephens, Young.
Silurian				Young
Ordovician			Ellenberger	Crane, Cooke, Regan.
Miscellaneous		Caprock on salt domes		Chambers, Duval, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Matagorda, Wharton.
		Serpentine		Bastrop, Caldwell, Medina, Travis, Williamson.

● Ready for shipment . . . this modern heavy-duty portable drilling rig is going to a major drilling contractor, for service where the digging is hard and the holes are deep. On these jobs they must have consistent performance, with minimum shut-downs.

This rig is equipped 100% with **LINK-BELT** double width Silverlink Roller Chain (2-½" pitch RCD-250S), and **LINK-BELT** Sprockets.

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acted at this time and became effective in September, 1920. It gave the commission jurisdiction over all natural gas utilities, and appellate jurisdiction in the matter of fixing rates at which natural gas would be sold in the various municipalities of the state.

The years 1922 to 1924 inclusive were ones of relatively steady expansion in all branches of the industry. In addition to many new pools in the vicinity of fields previously producing, several spectacular fields were discovered. Luling, discovered in August, 1922, was the first of the more important finds. It was followed in turn by Powell in January, 1923; Richland in February, 1924; and Wortham in November, 1924. The Powell discovery started a period of intensive exploration along the fault line, and it is generally credited with having resulted in the expenditure of several millions of dollars for new pipe lines and extensions to older ones. The trunk oil pipe lines in Texas at this time were all confined to the area east of a line drawn from Wichita Falls through Ranger to Houston.

Wortham is an excellent illustration of the rapidity of development in the fault line pools. Within two weeks from its discovery in November, 1924, over 100 derricks had been erected in the field, and the production increased rapidly to a total of over 3,500,000 bbls. for January, 1925.

Active development during this half decade was also very marked in North Texas as a result of extensions of Electra and the discovery of such new pools as Pioneer. Completions in the latter field were so rapid that the railroad commission ordered a delay in the completion of new wells until adequate pipe line or storage facilities were assured. This order had a marked effect on production in that field. Less favorable results followed a gentleman's agreement to curtail drilling in North Texas. Completions increased rather than decreased in May, June, and July, 1923, and began to decline only after drastic price cuts.

Record of Progress

Other events of interest and importance during these years were the purchase of oil on a gravity basis in North Texas; the development of an important natural gasoline business in Eastland and Stephens counties; the introduction of the seismograph and the torsion balance into the Gulf Coast in 1922; the completion of a 3,000-bbl. well in the Mirando area; a renewed activity in the old Nacogdoches field; the declaration of martial law at Mexia in January, 1922, by Governor Pat Neff; the first flowing oil production in the Panhandle; the discovery of production in the Big Lake field, 200 miles southwest of Ranger; the discovery of a non-inflammable gas in a well in Mitchell County; the granting by the railroad commission of permission to operate the first carbon black plant in Stephens County; the construction of an oil pipe line from Luling to Houston; and the construction of a gas pipe line from Cotton Valley, La., to Beaumont.

Spindletop, the first major discovery in Texas, had continued to produce oil during this entire quarter of a century, but its production had declined from over 17,000,000 bbls. in 1902 to 359,000 bbls. in 1924. In January, 1926, however, it again became a focal point of interest with the completion of an oil producer from a new deep sand on the southeast flank of the field. A new orgy of drilling followed and its production increased to over 20,000,000 bbls. in 1927.

Concurrent with this new activity at Spindletop was important development over the entire state. Oil production in the Panhandle increased from some 1,132,000 bbls. in 1925 to over 40,000,000 bbls. in 1927. West Texas forged ahead rapidly through the discovery of such impressive fields as Yates, Winkler County, Howard-Glasscock, McCamey-Taylor, and the Church-Fields McElroy area, and produced well over 100,000,000 bbls. of oil in 1928.

The net result of the rapid increase in production from these major fields and the many discoveries of lesser individual importance was reflected in a major expansion of oil pipe line facilities, in decreased prices for crude oil, and by activities of the railroad commission. During the year 1928 the commission undertook the proration of oil from three of the large fields of the state. Reports for that year indicate that the total production for the state, without proration, would have been more than 2,000,000 bbls. per day at the end of the year instead of approximately 722,200 bbls.

Accompanying this tremendous increase in oil production was an unparalleled expansion in the natural gas industry. This was particularly true in Southwest Texas and the Panhandle, where the completion of many wells had demonstrated the existence of great gas reserves. The first major gas pipe line construction in either of these areas was that by Houston Pipe Line Co. in 1925 from Lucas in Live Oak County to Houston, a distance of 224 miles, and extended to the Mirando area in 1926. At about this same time Houston Gulf Gas Co. line was constructed from White Point to Houston and subsequently extended to the Mirando area. Gas had previously been transported from the Mirando area to Laredo and from McMullen County to San Antonio. The extension into the Mirando district of the two lines from Houston and the line from McMullen County caused most active drilling, and at the end of 1926 that district had a total daily potential open flow capacity of over 2,000,000,000 feet. At the end of 1926 gas from 37 counties in Texas was being delivered to 113 towns and cities, and the combined daily open flow capacity of all gas wells was over 3,000,000,000 feet. Increased facilities for handling, active development of gas areas, and a greater demand for this fuel resulted in the serving of 442 towns and cities in 1928 with gas from 49 counties, the total daily potential of the wells at the end of that year being nearly 15,500,000,000 feet.

The demand for gas in states other than Texas and the success of transportation caused more extensive efforts in pipe line construction than ever before. Transmission lines of large diameter were constructed from the Panhandle to such distant cities as Des Moines, Chicago, and Indianapolis, and new lines and extension and loops to older lines were added in Texas. These facilities have been added to and increased more or less steadily up to the present time, and coupled with such expansion in the transmission of gas has been the development of the natural gasoline and carbon black industries to proportions previously unthought of.

The oil and gas industry in Texas had assumed proportions of great importance in the thirty years following the discovery of Spindletop. It was now represented by thousands of producing wells, a network of pipe lines, and adequate processing and distribution facilities over the length and breadth of the state. It had advanced in the face of such obstacles as depressed prices following periods of overproduction and was even now seeking new markets for the floods of oil from its many fields, in competition with other great discoveries in Oklahoma and California.

Then came East Texas!

The discovery of the Van field in 1929 had indicated that additional possibilities existed for Woodbine sand production in the great belt of territory north and east of the older fault line pools. It remained, however, for the Joiner well on the Bradford farm, completed October 5, 1930; the Bateman well on the Crimm farm, completed December 29, 1930; and the Farrell well on the Lathrop farm, completed January 26, 1931, to demonstrate the existence of a field whose equal has never been known in the history of the industry.

Spreading out rapidly from these three discovery wells, this field has expanded until it now contains over 24,500 wells and includes an area of 138,000 acres. Its development has been of a magnitude never before achieved. Hundreds of gushers were completed weekly. Nearly 1,500 miles of pipe lines with a total capacity of 749,500 bbls. were completed in and from the field in one year. Production increased from a daily average of 26,062 bbls. in February, 1931, to a peak of over 1,000,000 bbls. in August of the same year. Posted prices dropped 10 cents per barrel. Immediate action was necessary, and, by order of Gov. Ross Sterling, martial law was declared and the field was shut down August 17. It was opened up again on September 5 under an order curtailing production to 225 bbls. per well daily. This production has steadily been reduced by subsequent orders. The questions of proration, hot oil, bypasses, tender boards, enactment of new laws relative to proration, etc. are all familiar enough to require no further amplification. It should be noted, however, that as a result of the application of sound engineering principles in the proration of this field, it is still a flowing field after producing over 1,150,000,000 bbls. of oil, and should continue to flow a large portion of its production for many years.

Texas had proven to the world that its reserves of crude oil and gas were of an importance second to none. That has been demonstrated even more conclusively by the discovery, since that of East Texas, of such areas of major importance as Conroe, Anahuac, Tom O'Connor, Plymouth, Rodessa, the areas of Duval and Nueces counties, and a host of other fields. The latest development of importance is now taking place in the old K.M.A. district of North Texas, where shallow production was first secured about 25 years ago.

Structure and Stratigraphy

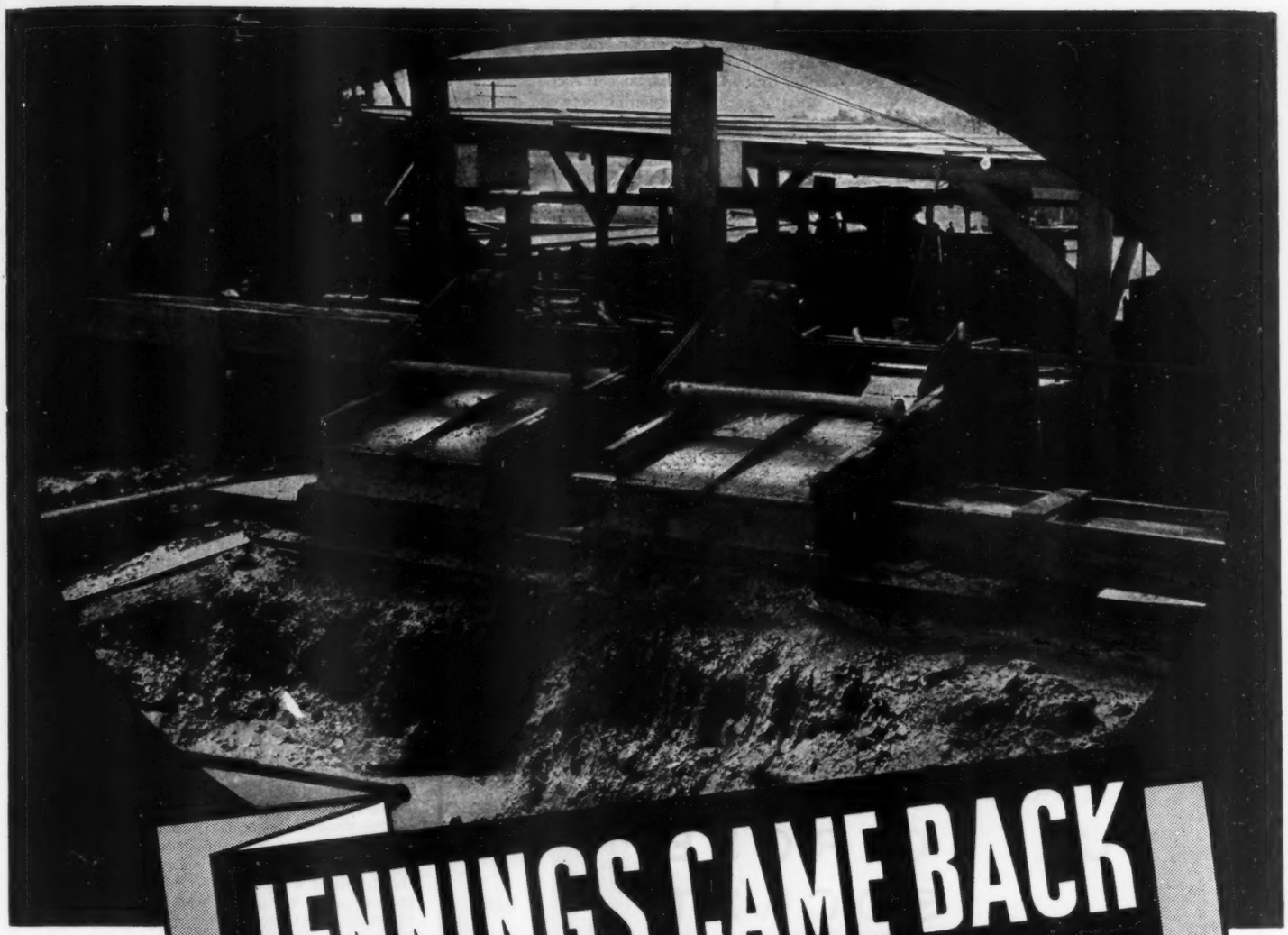
The structure of Texas cannot be included in any one broad classification. It varies greatly from one region to another and there is, in many parts of the state, a considerable variation between the surface and subsurface structure. Such variations include not only changes in rate and direction of dip between the surface and subsurface formations, but also such structural anomalies as buried hills and intrusives below the surface, their existence being proven only through explorations by geophysical instruments or test wells. Many of these subsurface features have had a marked influence on the deposition of more recent strata and the formation of secondary structures from which oil and gas are currently being produced. Excellent illustrations are to be found in the reversals of dip between the surface and some of the subsurface formations on the east flank of the Bend Arch, in the buried granite ridge of the Red River Uplift, and in the serpentine plugs of the Balcones Fault zone.

A classification of the regional structural provinces includes: (a) the general gulfward dipping monocline with its inward limit bounded roughly by a line from northeastern Montague County to the vicinity of Marble Falls in Burnett County and thence westward to the Marathon Uplift in Brewster County; (b) the Llano Uplift centering chiefly in the counties of Mason, Llano, and Burnett, where early igneous, pre-Cambrian, and Ordovician rocks are exposed at the surface; (c) the Van Horn, Marathon, and Solitario Uplift areas of El Paso, Hudspeth, Culberson, Jeff Davis, Presidio, and Brewster counties, where formations are exposed varying in age from Paleozoic, or earlier, to the present; (c) the Bend Arch extending northward from the Llano Uplift to southern Archer County, with exposures of Pennsylvanian and Cretaceous formations; (e) the Red River Uplift of Foard, Wilbarger, Wichita, Clay, Montague, Cooke, and Denton counties where earlier formations are covered by strata of Permian, Pennsylvanian, and Cretacious ages; (f) the Amarillo Uplift with its granite ridge buried beneath Permian, Triassic, and Recent formations; and (g) the West Texas Basin where surface strata varying from Recent to Triassic in age overlay successively older formations.

All of these general structural provinces may, by closer study, be subdivided into several more minor features. This is exceptionally well illustrated by the Franklin, Delaware, Glass, Chisos, and other mountain areas with their complex folding and faulting in the Van Horn, Marathon and Solitario regions. It is also exemplified in the gulfward dipping monocline area with its salt dome belt along the coast, its series of interior salt domes in the Tyler Basin, the Balcones and Mexia fault zones, and the Sabine Uplift.

These general structural provinces and their individual minor features are the result of a series of general adjustments between the seas and the land masses from the time of earliest sedimentation. They are of particular importance to those interested in the production of oil and gas, because of their relationship to the accumulation of such commodities. An analysis of regional structure and conditions of deposition will disclose general areas in which prospecting may be carried on with a greater degree of confidence. A more detailed study of the general area will then disclose whether or not deposition or structural movement has been such as to result in the formation of a suitable trap for the accumulation of oil and gas.

The earliest sedimentation here apparently took



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LINK-BELT SCREEN

place in seas that covered a considerable portion of the central part of Texas. The material deposited is thought to have been derived from the weathering down of a land mass then existing along the present coastal plain. A very pronounced early deposition occurred along a belt, the central part of which extends from Fannin County on the north, southward through San Antonio, and thence westward to the Solitario and Marathon uplifts in Brewster County. This immediate area of deposition is of more than ordinary importance. It has unquestionably been an important factor in structural movements resulting in the Balcones and Mexia fault zones along which profitable oil and gas production has been secured; it is the locale of serpentine, or altered igneous intrusive, production; and it corresponds in part with the division between the present exposure of upper and lower Cretacious formations.

The deposition of these early sediments was followed by that of Cambrian and Ordovician times, during which the Ellenburger lime was laid down to the west and north of the belt mentioned above. Subsequent folding has resulted in the formation of areas favorable for production from the Ellenburger, as shown by that secured in Cooke, Crane, and Reagan counties.

In the period intervening between the deposition of Cambrian and Ordovician sediments and those of the Pennsylvanian, some sedimentation of Silurian, Devonian, and Mississippian ages took place over a part, at least, of central and western Texas. Its extent is a matter of considerable conjecture and its productive possibilities are not yet completely known, although production has been secured along the Bend Arch from strata presently classified as Silurian. Future explorations may reveal other areas capable of production from reservoir rocks of these three ages which are now producing in Oklahoma and Kansas to the north.

Deposits of Pennsylvanian age are well represented in Texas, spreading out over a broad area to the north, west, and southwest from the Llano Uplift. Lower Pennsylvanian strata, represented by the Bend Formation, extend over a considerable region in the north-central part of the state. They have been prolific productive horizons at Ranger and in other fields on the Bend Arch. Their absence, entirely or in part, over such features as the Red River Uplift, and the presence in them of folds uncomformable to Upper Pennsylvanian rocks in the Llano region indicates a recession of the sea and a period of erosion prior to the deposition of the Cisco, Canyon, and Strawn strata. The latter formations are major sources of production in north and north-central Texas.

A shifting of seas after the Cisco formation was laid down resulted in the formation of the West Texas Basin in which were deposited the thick Permian sediments. This sea extended over that portion of the state west of a line from Montague County to the Llano Uplift. The formations thicken rapidly from their eastern limits to at least 7,000 feet in Reagan County and were deposited unconformably over such earlier mountain masses as the Amarillo and western Red River uplifts. These strata contain important productive horizons in West Texas and the Panhandle and have yielded considerable oil in North Texas.

The deposition of Triassic formations followed those of Permian age over large areas of western Texas and were succeeded by minor deposits of Jurassic age. Neither are now of any economic importance as oil producing horizons, even though secondary production is being secured from Jurassic strata at Yates.

With the close of Jurassic age came the beginning of another major sea invasion of Texas and the deposition of Cretaceous strata over practically the entire state. Advances and recessions of the Cretaceous seas, accompanied by changes in depth, resulted in the deposition of such important strata as the Trinity series, the Edwards lime, the Woodbine sand, and the Taylor, Navarro, and other formations. The present importance to the oil industry of the conditions under which these strata were deposited may be readily appreciated from the manner in which the trap constituting the East Texas oil field was formed at that time. Deposition of the Woodbine against the Sabine Uplift, followed by erosion and the unconformable deposition of the impervious Eagle Ford shale and Austin chalk, caused a sealing off against the further migration updip of oil and gas in the porous sand members. Cretaceous horizons have proven of major economic importance for oil and gas production. They were the source of the first recorded production from the Dulnig wells, and they have yielded the East Texas field, Corsicana and the fault line fields of the Mexia-Powell and Luling areas, and other sand and lime pools extending from Rodessa to Maverick County.

The Cretaceous age ended with an elevation of the land mass and a retreat of the sea, followed in Tertiary times by another incursion of the sea and the deposition of strata east and southeast of the belt of earliest thick sedimentation in the vicinity of the Balcones Fault. Eocene and more recent formations therefore cover the areas known as South and East Texas. The history of their deposition has been a series of transgressions and recessions of the Gulf waters and the consequent intergrading of sediments carried down by streams from the interior of the state.

The many adjustments between sea and land have resulted in the formation of faults and structural and depositional features often buried but contributing largely to present day fields in the area. The Conroe field is an excellent example of a pronounced subsurface fold. Faults, traceable at the surface or determinable only by subsurface exploration of one type or another, have accounted for production at Silsbee, Segno, and in the Pettus area. Changing conditions of sedimentation resulted in a pinching out updip of sand strata and the formation of sand lenses productive in the Mirando area and at Nacogdoches. The intrusion of salt masses and the formation of such prolific reservoirs as Spindletop and West Columbia may well be attributed to early lines of weakness developed during such periods of adjustment.

General structural and depositional features controlling the accumulation of oil and gas in the various producing regions of Texas may be classed as follows: *East Texas*, faults, unconformities, and buried folds; *Gulf Coast*, salt intrusives, faults, and folds possibly resulting from deeply buried intrusives; *Southwest Texas*, faults, folds, deposition

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Fig. 626

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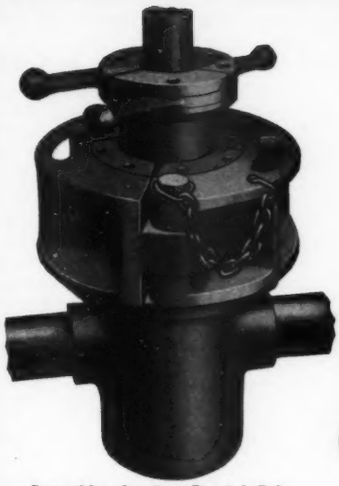

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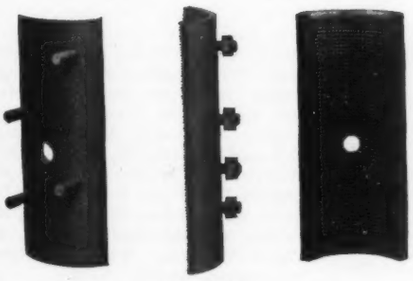
Showing the two halves of Two-Piece Slips, also liners for same. 13¼" bearing surface against pipe.



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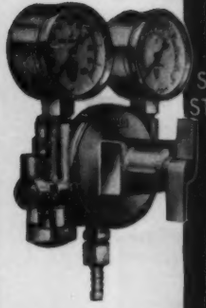

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of lenticular sands, and salt intrusives; *Central Texas*, faults, folds, and altered igneous intrusives; *North and North Central Texas*, folds, unconformities, and faults; *West Texas and the Panhandle*, folds and unconformities.

A general summary of the major producing formations and the counties in which they are productive is given in the accompanying table.

Production

The producing areas of Texas may be divided for ready convenience into the major producing district of (a) East and East Central, (b) Gulf Coast, (c) North and North Central, (d) Panhandle, (e) Southwest, and (f) West Texas.

Recorded production data indicate that a total of approximately 5,111,239,000 bbls. of oil has been produced in Texas since 1889. The total marketed value at the well of the oil produced is estimated at $5,585,602,000.

Oil production was first secured in the East and East Central district, and development in that region during subsequent years has resulted in the great Woodbine sand fields, as well as pools from other horizons. The total production from this district, exclusive of oil produced at Nacogdoches prior to 1900, has been 1,541,615,000 bbls. Of this total, approximately 95 per cent has been produced from the Woodbine sand. The East Texas field, producing from that horizon, is credited with a total production of 1,132,128,135 bbls. up to January 1, 1938. This figure, which exceeds the total for any other field in the United States, and that for any other nation in the world except Russia, Mexico, and Venezuela, does not purport to account for all oil which may have been surreptitiously produced.

Southwest Texas was the first district from which actual records are available as to the amount of oil produced. This area, including the subdistricts of Coastal, Laredo-Pettus, and Fault Line, has accounted for 423,775,000 bbls. of the state's total production. The Fault Line district, producing from Cretaceous formations and altered igneous intrusives, has produced 41 per cent of the total; the Laredo-Pettus region accounted for 33 per cent from Eocene, Oligocene, Mioncene, and Pliocene horizons; and the remaining 26 per cent was secured from Oligocene and Miocene strata in the Coastal belt.

The Gulf Coast was the first major producing district. This area, producing from the Eocene, Oligocene, Miocene, and Pliocene horizons and from caprock, has produced 1,052,536,000 bbls., of which total 125,273,025 were secured at Spindletop.

North and North Central Texas has contributed a total of 907,605,000 bbls. since 1904. Burkburnett and Electra have been the premier individual pools of this area, with respective totals of approximately 149,042,000 bbls. and 128,597,000 bbls. Production in this area is from Ordovician, Silurian, Pennsylvanian, and Permian reservoir rocks.

The Panhandle district, producing from Pennsylvanian and Permian horizons, has produced 303,854,000 bbls., and West Texas has produced 881,854,000 bbls., chiefly from Permian formations, although some production has been obtained from Ordovician and Pennsylvanian strata with a minor amount from the Jurassic.

An accompanying chart shows, in graphic form, the average daily production by years for the state of Texas, the cumulative production by years, the year in which the first commercial production was obtained in the above major producing districts, and the year in which oil was discovered in some of the more important pools of the state.

Records of gas production begin in Southwest Texas in 1889. Although data are vague as to the total amount produced prior to the inauguration of measurement by meters about 1905, Texas has produce dsubstantially in excess of 6,750,000,000,000 feet of gas.

Summary

The position of Texas in the oil and gas industry is one of pride to all Texans. Within a scant half century it has surpassed all records of other producing areas. It can justly claim unequaled reserves of oil and gas. Its production provides cheap and convenient fuel for millions of people in hundreds of cities and villages and facilitates the speedy transportation afforded by the airplane, automobile, train, and ship. The present production of Texas is by no means its maximum possible. It can be increased many-fold without the drilling of a single additional well and can be augmented even farther by additional development. The revenue from this industry provides food and shelter for thousands, pays for a substantial part of self-government, and assists in the education of the youth and the building of roads in the state. Truly, the words "oil and gas" and "Texas" are synonymous.

The data herein are compiled from reports of the U. S. Geological Survey, the U. S. Bureau of Mines, the Railroad Commission of Texas, and publications of the University of Texas and supplemented by private reports and individual information.

Variations in Gravity

Below 20°

Austin, Bexar, Chambers, Brazoria, Duval, Ector, Fort Bend, Hardin, Harris, Hidalgo, Liberty, Medina, Navarro, Orange, Starr, Victoria, Washington, Webb, Zapata.

20°-25°

Austin, Bastrop, Bee, Bexar, Brazoria, Brooks, Caldwell, Chambers, Cooke, Duval, Fort Bend, Franklin, Frio, Galveston, Hardin, Harris, Hidalgo, Hopkins, Houston, Jasper, Jefferson, Jim Hogg, Jim Wells, Kleberg, Liberty, Limestone, Live Oak, Matagorda, McMullen, Montague, Navarro, Nueces, Orange, Pecos, Refugio, San Patricio, Scurry, Starr, Titus, Victoria, Waller, Washington, Webb, Wharton, Winkler, Zapata.

26°-30°

Anderson, Andrews, Austin, Bastrop, Bee, Bexar, Brazoria, Caldwell, Chambers, Cooke, Crane, Crockett, Ector, Fort Bend, Freestone, Frio, Galveston, Glasscock, Guadalupe, Hardin, Henderson, Houston, Howard, Hutchinson, Jackson, Jefferson, Liberty, Matagorda, Medina, Mitchell, Montague, Moore, Navarro, Nueces, Orange, Pecos, Reeves, Refugio, San Patricio, Starr, Upton, Victoria, Webb, Wharton, Wheeler, Winkler.

31°-35°

Andrews, Atascosa, Austin, Bastrop, Bee, Bexar, Brazoria, Brown, Caldwell, Calhoun, Carson, Chambers Cochran, Coleman, Comanche, Cooke, Crane, Crockett, Dawson, Duval, Eastland, Ector, Erath, Falls, Fisher, Fort Bend, Frio, Galveston, Glasscock, Gonzales, Gray, Guadalupe, Hardin, Harris, Howard, Hutchinson, Jack, Jackson, Liberty, Matagorda, Medina, Mitchell, Montague, Moore, Navarro, Nueces, Orange, Pecos, Reagan, Refugio, San Patricio, Shackelford, Starr, Taylor, Travis, Upton, Van Zandt, Victoria, Ward, Webb, Wharton, Wheeler, Winkler, Yoakum.

36°-40°

Anderson, Aransas, Atascosa, Austin, Bastrop, Baylor, Bee, Bexar, Brazoria, Brown, Caldwell, Callahan, Carson, Chambers, Cherokee, Clay, Coleman, Comanche, Cooke, Crane, Crockett, Eastland, Ector, Erath, Fisher, Foard, Fort Bend, Freestone, Frio, Galveston, Garza, Glasscock, Gray, Gregg, Guadalupe, Hardin, Harris, Haskell, Howard, Hutchinson, Irion, Jack, Jim Wells, Jones, Liberty, Limestone, Loving, Marion, Matagorda, McLennan, McMullen, Medina, Milam, Montague, Montgomery, Moore, Navarro, Newton, Nueces, Orange, Palo Pinto, Pecos, Polk, Reagan, Refugio, Rusk, San Patricio, Shackelford, Smith, Stephens, Taylor, Throckmorton, Upshur, Upton, Victoria, Ward, Wharton, Wheeler, Wichita, Wilbarger, Williamson, Winkler. Young.

41°-45°

Anderson, Aransas, Bee, Brazoria, Brown, Calhoun, Carson, Cass, Cherokee, Coleman, Colorado, Comanche, Cooke, Duval, Eastland, Erath, Foard, Fort Bend, Fisher, Galveston, Goliad, Gray, Hardin, Harris, Jones, Karnes, Leon, Liberty, Live Oak, Loving, Marion, Matagorda, Maverick, Navarro, Nueces, Polk, Refugio, Runnels, San Patricio, Tyler, Victoria, Webb, Wharton, Wheeler, Wichita, Young.

46° and above

Aransas, Bee, Brazoria, Calhoun, Chambers, Duval, Fort Bend, Galveston, Goliad, Harris, Hidalgo, Karnes, Liberty, Live Oak, Matagorda, Montgomery, Nueces, Polk, Reagan, Refugio, San Patricio, Victoria, Webb, Willacy.

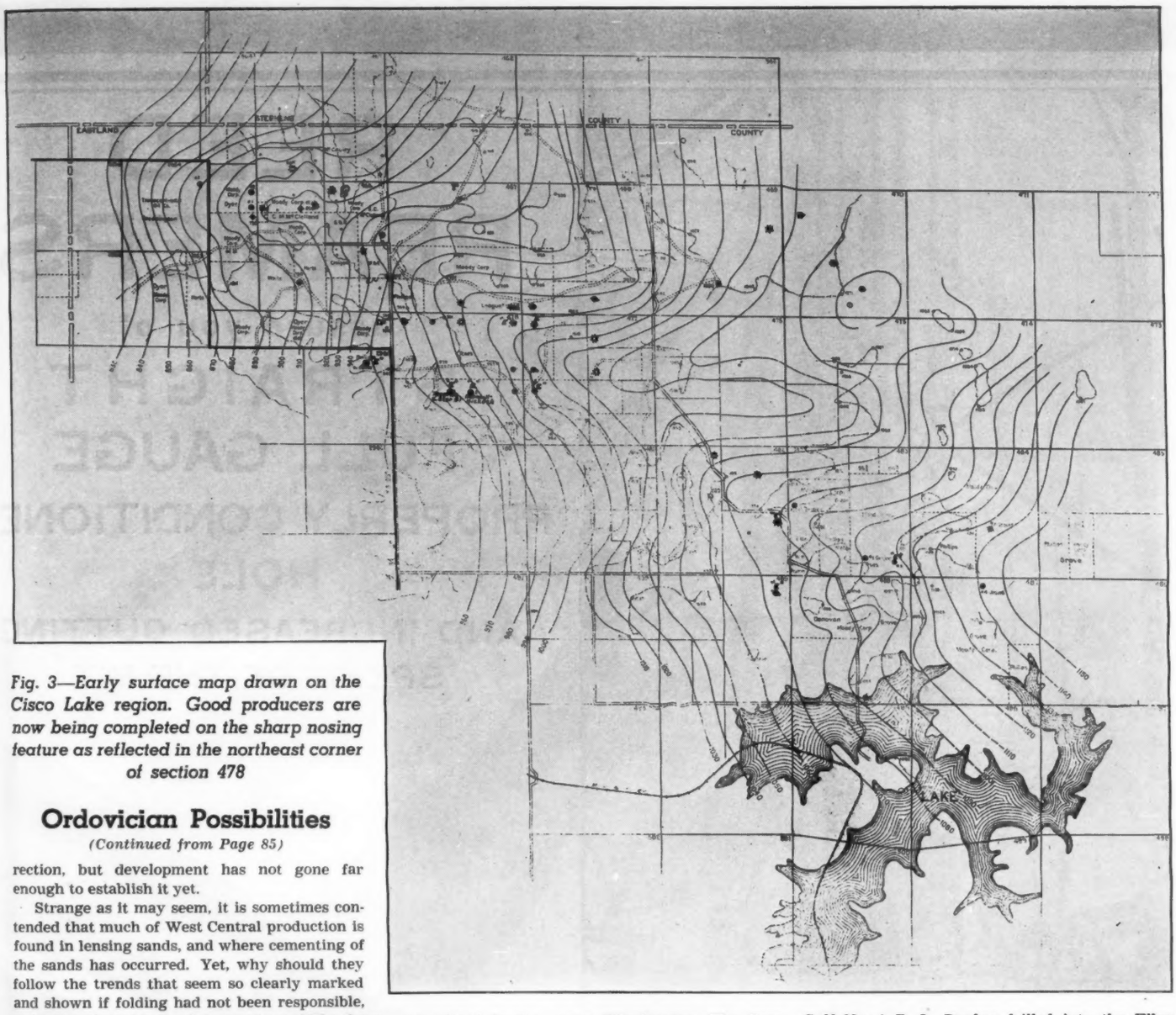

Fig. 3—Early surface map drawn on the Cisco Lake region. Good producers are now being completed on the sharp nosing feature as reflected in the northeast corner of section 478

Ordovician Possibilities

(Continued from Page 85)

rection, but development has not gone far enough to establish it yet.

Strange as it may seem, it is sometimes contended that much of West Central production is found in lensing sands, and where cementing of the sands has occurred. Yet, why should they follow the trends that seem so clearly marked and shown if folding had not been responsible, and also reflected by surface structures? The shoreline theory could not be applicable unless it be considered a rare coincident that production from all the horizons that are productive on these trends would occur conformably.

The Cook pool and other minor pools are unquestionably sand condition pools, yet the Cook field lies on a terrace close to a steep dip to the northwest.

During the Ranger boom of 1919-20 a good many wells were drilled to the Ellenburger. Records of many were not kept, but a few of those known to the writer will be mentioned. In the first place, it should be pointed out that possibilities of production from the deeper wells were handicapped from the start, as all of them were those which found the Ranger pay dry and were carried deeper for the purpose of exploration. Hence, their structural position was unfavorable from the beginning. Also, poor completion methods, and the unwillingness to consider a 50- to 150-bbl. well commercial in those boom days when 2,000- to 10,000-bbl. wells were common, caused the junking of many otherwise profitable Ellenburger producers.

The first Ellenburger well of West Central Texas was drilled in 1919 4 miles west of Seeps Springs, Comanche County, by Humble Oil & Refining Co. in the Goss pool. A good gas well was completed in the upper Ellenburger. The Goss structure was worked out by surface geology.

Two miles east of Ranger, Prairie Oil & Gas Co. No. 1 Phillips drilled to a total depth of 4,200 feet in 1920. It went out of the Barnett shales at 3,850 feet. No showings were evident in the Ellenburger. There were no surface indications of structure here.

Texas and Pacific Coal & Oil No. 1 W. T. Pitcock, at the south edge of the town of Ranger, was drilled during the boom in 1920. It found the upper pays nonproductive because of unfavorable surface and subsurface position, and drilled into sulfur water at 4,020 feet in the Ellenburger.

The next Ranger deep test was Prairie Oil & Gas Co. No. 1 Falls, about 5 miles south of Ranger. Slight showings were had in the Ellenburger, and had the formation been acidized a commercial well might have resulted. The well was abandoned.

About 4 miles north of Ranger, Texas and Pacific Coal & Oil Co. No. 1 Cook went into the Ellenburger and made a 50-bbl. flowing well without the aid of acid or shooting. This well was favorably located on surface structure, also being near the top of the Bend Arch. Lower beds all around this well were producing also. A 50-bbl. well was not attractive then, and the hole was abandoned.

Four miles northwest of Ranger, Sinclair-Gulf No. 1 B. L. Danley drilled into the Ellenburger and started off making approximately 1,000 bbls. daily with large quantities of gas. The energy was dissipated rapidly and the production rate fell off. When the production got down to 100 bbls. per day it was plugged. This well was situated upon a pronounced surface nose.

In the Cross Plains region of southeastern Callahan County, New South Oil Co. drilled the Vestal well, which made 900 bbls. for some time, and its production rate was well sustained. Later, operators unwisely went in and drilled the hole 7 feet deeper and drilled into sulfur water and it was abandoned. Location was on a well defined surface nose. Another well is being drilled to the Ellenburger here at the present time.

Empire Oil & Gas Co. No. 1 May Johnson, southwest Callahan County, encountered two gas pays in the Ellenburger, one gauging 15,000,000 feet and the other 10,000,000. Oil was produced from the lower pay, gauging 1,000 bbls. per day initially. After yielding about 28,000 bbls., mechanical troubles developed to retard the well's productive life.

The South Bend field in southern Young and northern Stephens County is situated high on the axis of the Bend Arch, and gives strong indications

(Continued on Page 142)

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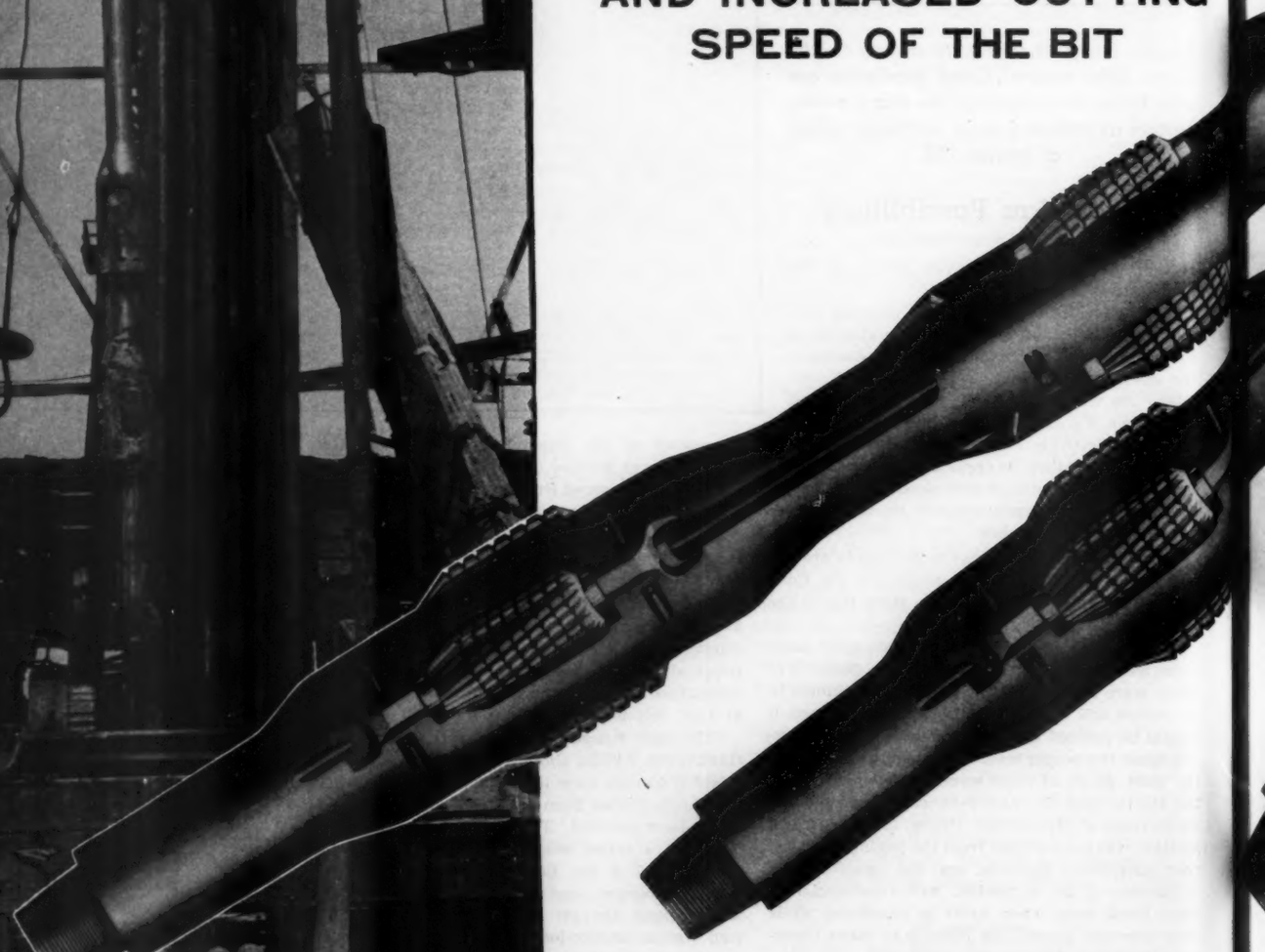

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of surface structure. The field has produced much oil from the Strawn and Bend formations. Here the outstanding Ellenburger production has also been obtained, as the famous Panhandle Refining Co. No. 7 McCluskey drilled into the Ellenburger horizon in 1927 and produced well over 1,000,000 bbls. of oil during its first year on production, and is still producing. Five additional wells of much smaller productivity were drilled and completed around it. A study of the formations at South Bend from the outcropping beds down to the Ellenburger gives definite proof of the close conformity existing between surface and all intermediate formations. The outcropping beds here show about 10 feet of closure. Five sands in the Strawn series from 1,800 to 2,600 feet produced with initial productions as high as 2,500 bbls. daily and showed about 50 feet of closure. The Middle Bend group showed a closure of about 100 feet, and maximum initial productions were about 6,000 bbls. The Ellenburger structure showed about 200 feet of closure at about 4,200 feet, and yielded much larger ultimate quantities of oil.

Stephens County

Texas and Pacific Coal & Oil Co. No. 1 Homer Lee, 4 miles north of Caddo, Stephens County, made 125 bbls. initially 100 feet below the Barnett shales.

In 1936, Larenzen and others drilled No. 1 Biggerstaff, which had good showings in the Ellenburger, but due to mechanical difficulties and inability to shut off upper water, the hole was abandoned. Location was about 3 miles southwest of Putnam in Callahan County.

Three wells were drilled by Humble Oil & Refining Co. in 1936 in an attempt to define an apparent structure on the De Lefosse lands in eastern Shackelford County just east of Albany. All three of these wells had good showings in the Ellenburger but were drilled or shot into water and abandoned.

West of Moran in southeast Shackelford County, two wells were drilled to the Ellenburger; one on the Webb tract which had fairly good showings and was rather well located on the surface structure; the other on the Snyder lands in section 35 drilled into the Ellenburger without showings. The latter location was made on a terrace and not favorably situated from a surface standpoint for Ellenburger production.

Just south of Abilene, the entire Ellenburger section was drilled, finding it about 600 feet thick, before going into the Packsaddle schists of pre-Cambrian age. A noticeable thinning of the Ellenburger section was observed here, as normally the Ellenburger thickness is considered from 1,000 to 1,500 feet. This area is known to be high on the Ellenburger, but the direction and extent of the arch is not definitely known. No showings were had in this well, probably because the oil bearing portion of the Ellenburger was erroded off.

Cisco Lake Field

The Cisco Lake region is particularly important because today large producers are being completed in the Ellenburger. Surface structure was first mapped here in 1924, showing a pronounced nosing. The first well was drilled by Adams & Riley on the McClelland tract, which was completed as an 8,000,000-foot gas producer in the Eastland Lake sands, but did not go deep enough to encounter the oil which was later tapped in the Ellenburger. Later, in section 487 No. 4 Groves was completed close to and above the Barnett shales and has to date produced over $1,000,000 worth of oil and gas.

The early surface work done on this territory, as shown in map Figure 4, indicated a pronounced and sharp nosing on the surface around the northeast corner of section 478. On this nose five good producers have been completed recently in the Ellenburger, the largest of which was Lone Star Gas Co. No. 1 Thomas, gauging 1,183 bbls. per day initially. To establish further the contention that whenever wells are located off the surface structure their chances of production are quickly discounted, it may be pointed out that the Donovan well in the northwest corner of section 489 (see Figure 4) was definitely off the axis and was a dry hole. Because of the late and important developments at Cisco Lake, it is important to note that not a single well located favorably on the surface axis has been dry, and all those unfavorably situated have been nonproductive.

Oplin Field

The Oplin structure, situated about 10 miles southeast of Abilene in southwest Callahan County, was first worked out in 1924. This feature is very noticeable from surface geological mapping. There is present one of the most pronounced structures in the entire area, where about 8 feet of reverse dip is noted. Primarily, there is a plunging anticline, which extends under the surface Cretaceous beds to the west, preventing any estimation of its extent. About 12 years ago a well was drilled into gas production here at 3,400 feet in a sandy zone about 900 feet in the Strawn group, corresponding very closely to the present deep producing level at K.M.A. All other Oplin wells have had good showings in this shallow sand. Late in February, 1938, Hal Hughes and associates completed their No. 1 Poindexter at Oplin in the Ellenburger. First railroad commission gauge amounted to 896 bbls.

Ellenburger Analysis

With the assistance of the B. S. Sorelle Geological Department Laboratory at Chicago, the following facts were worked out in analyzing cuttings from Moody Corp. No. 3 Groves, on the Cisco Lake anticline, through the Bend series and the Ellenburger. This is one of the very few Ellenburger wells that saved complete sets of samples, and were fully analyzed.

From 3,897 to 4,040 feet, or a section of about 40 feet, there is a series of crystalline limestones varying in color from white to tan, with considerable dark gray shale. This continues with varying changes, and with an abundance of organic remains, such as chrinoid stems and a profusion of spunge spicules. According to laboratory analysis, this section was not considered to be of Ellenburger age; at least not the characteristic Ellenburger known in the Central Minerals region.

From 4,040 to 4,115 feet there were no fragments of organic matter, the white limestone was mixed with flint, which was largely in oolitic form, glauconitic shales, pink calcite, and with all the limes predominately dolomitic. This was considered to be the true Ellenburger.

These samples checked and compared very closely to samples recovered and saved in the recently drilled Irving and Poindexter wells at Oplin in Callahan County, about 40 miles to the south.

Discovery well in the Big Lake field, Reagan County, western Texas, completed in 1923. Well still producing commercial quantities of oil

Below Barnett Shales

Below the Barnett shales in the Cisco Lake region there was about 150 feet of section that seemed to run quite uniform, but difficult to definitely distinguish. It is younger than Ellenburger proper as it outcrops in the Llano uplift. In the Poindexter well at Oplin, from 4,369-70 feet a red looking material was blown out by the gas. A thin section of this showed to be a red granitic reworked material, finely pulverized, but recemented. In this was noticed some quartz crystals, as well as calcite crystals. This no doubt represents an unconformity between the Ordovician proper and the unclassified section of 150 feet below the Barnett shales, which is possibly Mississippian.

The Ellenburger lime differs from many horizons in that it was exposed for many ages to the influence of weathering and surface waters carrying vegetable acids. The porous zones in most other producing horizons in the younger ages lie nearly horizontal. Their strata were laid down with varying porosity and with impervious shale partings, while the Ellenburger was exposed to weathering, then traversed and penetrated by waters carrying vegetable acids. This created a porosity both vertically and horizontally. The crystallization and metamorphism of the lime would only tend to increase this irregularity.

The Barnett shales which were highly carbonaceous carried waters that were strong with vegetable acids. These waters would no doubt work their way down along fault zones and bedding planes to depths that are within the range of the producing horizons of the Ellenburger. Anticlinal areas in the Ellenburger would be most affected by such transitions.

Ellenburger Erratic

This might explain to a large degree the erratic nature of Ellenburger production. It also makes it quite apparent that acidizing would be very effective and would open up zones of porosity that otherwise would never become productive. This condition is going to require engineering and producing methods yet to be developed. It has already been learned, however, that pressure must be held on the wells to prevent too rapid voiding of the producing formation. Coning similar to water invasion in the Woodbine sands will be retarded and prevented by proper pressures and gas conservation.

With the dearth of evidence available at this time, it would be useless to attempt any differentiation between the Simpson and Ellenburger zones of the Ordovician. It is altogether probable that a section of the Simpson sand lies above the Ellenburger and unconformably below the Bend group. However, for the time being, the term Ellenburger, as generally applied to everything between the Barnett shales and the granite in this district, has been used.

Permian Lime Reservoirs Large Factor in Output

By MITCHELL TUCKER

A very substantial portion of the crude oil reserves in Texas, and in the country as a whole, is from Permian lime reservoirs of Paleozoic age. During 1937 an estimated 500,000,000 bbls. of new oil was added to the state's reserves in new fields from the Permian lime. This represents about 40 per cent of the new reserves of Texas, and about 30 per cent of the new reserves in the United States. About 10 per cent of the wells drilled in the United States last year had production in the Permian fields of Texas as their objective. Only 10 per cent of them were dry, as compared to a 20 per cent dry hole average for the entire country. Production from the Permian fields in West Texas and the Panhandle averages about 253,000 bbls. daily, or about 20 per cent of Texas daily production. Furthermore, over one-fourth of all drilling in Texas today is seeking production in the Big lime of Permian age. This horizon is second only to the Woodbine sand of eastern Texas in reserves and production, and is more active with respect to drilling. Present developed Permian lime reserves in Texas are now estimated in the neighborhood of 2,000,000,000 bbls.

Having a productive horizon so widespread, it is desirable to study some of its characteristics. No other work requires a more thorough knowledge of reservoir characteristics than the estimating of reserves. For that reason, some of the past, present and proposed methods of evaluating Permian fields will be discussed.

The Permian (or Big lime) occurs in thicknesses from 1,000 to 3,000 feet, depending upon its position in the West Texas Basin. Saturation does not occur in any particular subdivision in the stratigraphic column, or in any particular portion of any of the subdivisions for that matter. Generally speaking, most of the saturation and porous portions of the Permian in the west platform fields of West Texas occur in cavernous dolomite in or near the top of the Delaware Mountain series of the Big lime. In the east platform fields, the Double Mountain series immediately underlies the Delaware and carries most of the cavernous or porous and saturated beds. A considerable number of sands occur within this series, from which such large fields as the Kermit, South Ward, North Ward, and others produce. Permian production in the Panhandle of Texas is from the Wichita-Albany or lower series.

Speaking especially of West Texas, points of oil and gas accumulation in the Big lime depend largely upon the effective porosity (or permeability) of the formation. The percentage of pore space and its interconnection is thought to be due to dolomitization or solution cavities. Variations of this physical factor are readily noted from well to well. This accounts for the observed wide differences in initial productions of offset wells and in the saturation tops within what otherwise appears to be a common reservoir. Although drill records indicate the saturated zones within the lime to be decidedly lenticular in character, sensitive communication between wells is often noted. One or more saturated zones often occur in the productive section of the Big lime, each one arched into a closed structure and constituting a reservoir in itself. The effective porosity may and does vary widely in each of these several zones of saturation.

Fractured or cavernous conditions in the dolomite make for a very high degree of directional permeability, and allow the unrestricted movement of fluid and gas to the well bores which

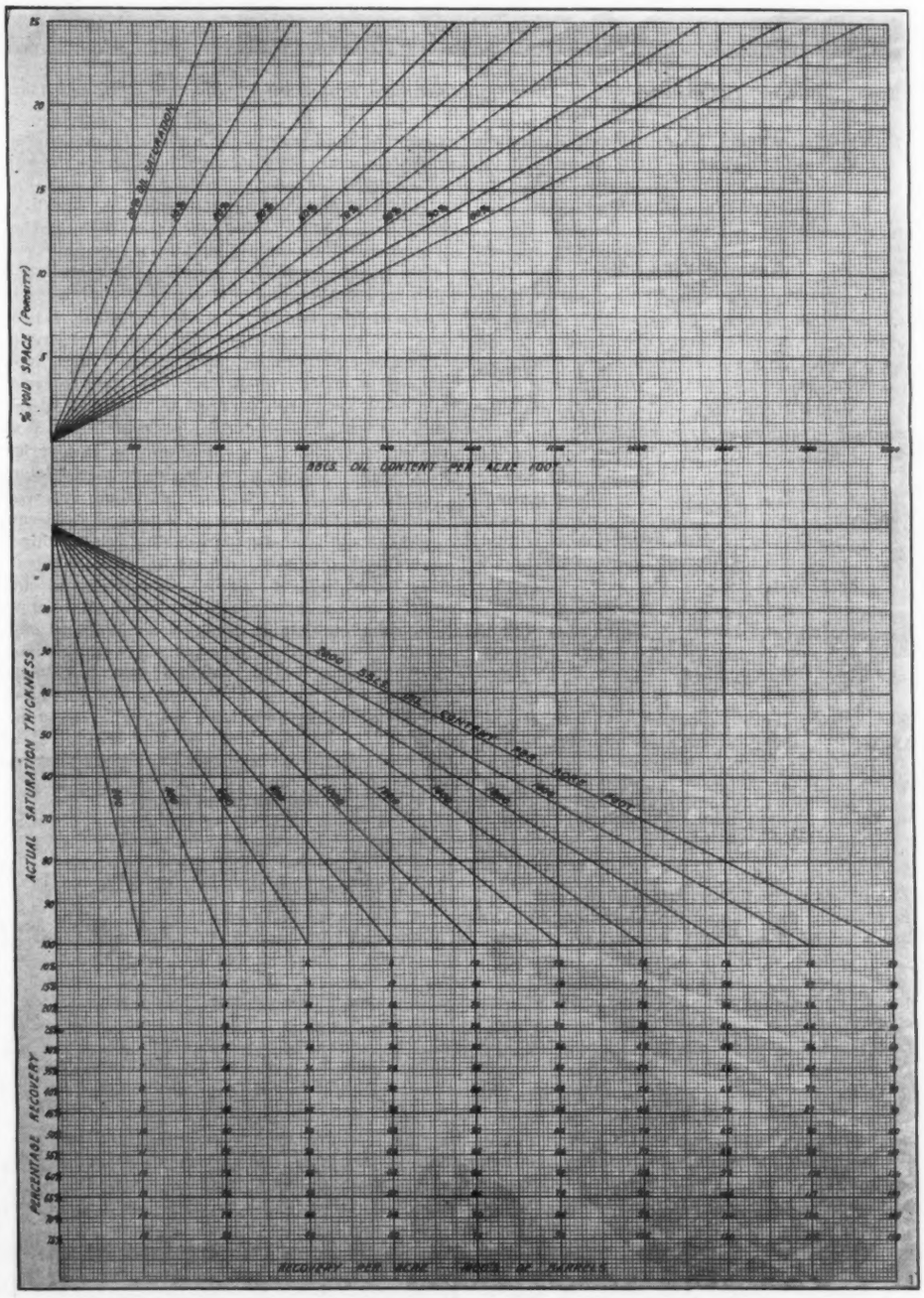


Fig. 1—Graphic chart for applying the volumetric method of reserve estimations. Directions: Follow the assumed porosity factor across to desired Per Cent Saturation, thence down to the observed Barrels Oil Content Per Acre Foot, thence to the Actual Saturation Thickness, and down to the estimated Percentage Recovery. Interpolations can be made between the Recovery Per Acre figures shown

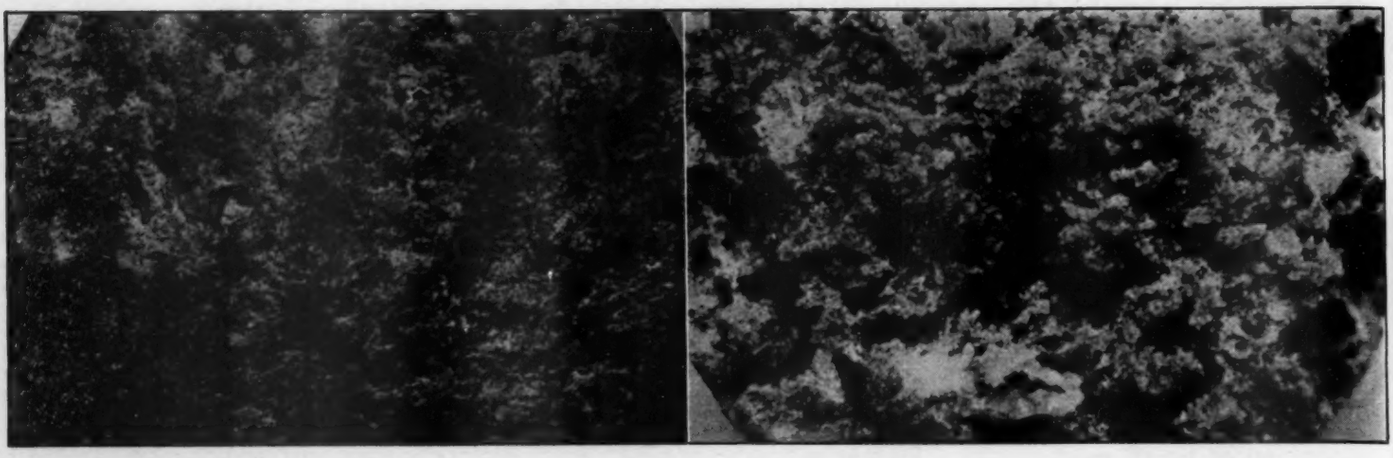


Fig. 2—Showing microphotographs of a tight Permian lime core before and after acidizing. Photographs through courtesy of Dowell, Inc.

have penetrated them. Many Permian wells have produced from 1,000,000 to 5,000,000 bbls. of oil each. These, of course, are the exception, and are no doubt situated in the path of one or more of the cavernous zones.

Reserve Estimates

Several thoroughly sound methods for estimating underground and recoverable petroleum reserves in prorated lime fields have been advanced. Most of them, however, remain inoperative because of the inability to determine early in the field's life under which type of control the reservoir is operating. Also because of the dearth of data available, and the difficulty or impossibility of obtaining it.

For estimating of recoverable oil in Permian reservoirs within reasonable degrees of accuracy, two of the oldest methods known are still almost universally employed, each one used as a check against the other.

Permian production was first opened in West Texas in 1923 and much has been learned from observation and experience during the reservoir declines of the early fields in the past 15 years. It often has been said that each limestone reservoir in West Texas displays individual characteristics that make comparisons between them of little value. However, having a 15-year background of many different types of reservoirs to draw from, and by tempering all deductions with judgment in the light of past records and indicated future performances, reasonably accurate estimates of ultimate recovery are possible. In considering probable productivity of new fields, they should be compared with older areas of somewhat similar initial pressures, gas-oil ratios, potentials (if taken under similar conditions) and apparent form of reservoir control.

Granting that the comparative method offers many chances for error, a check by the volumetric method may be made and a balance struck between the two should afford reliable deductions. Application of the volumetric, or porosity-saturation, method must also be made in the light of all past and present available data, and tempered with judgment. The factors which permit greatest opportunity for error in volumetric calculations in the Big lime are the "porosity," "percentage recovery," and the "saturation thickness." The comparative method provides a good balance check against inaccuracies in these factors, however, because productivity to date in the older fields is a direct relation of their importance and magnitude. Fifteen years' experience as a background, and the newly developed methods of formation coring and analysis, will permit much more accurate determinations of these variables in the porosity-saturation method. Drilling time records have recently established themselves as a reliable guide to porosity and saturation thickness.

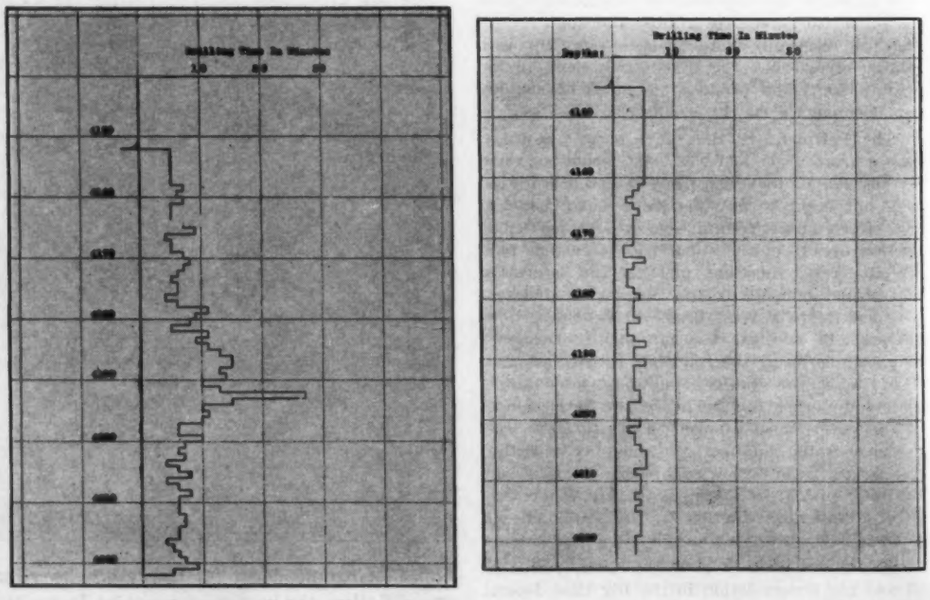
First application of proration in Big lime fields was made in 1930. Decline curves might be drawn from meager production figures for those fields that were producing prior to that time, but they would not be representative of today's fields due to improvements in well completing, acidizing, and more conservative producing practices. It is important to note that of all the early fields opened in the Permian, only one—the Howard-Glasscock field—has declined to the point where it is no longer restricted by proration upon production over the marginal allowable. Recoveries and declines of this area will be discussed later.

Undoubtedly, estimates of petroleum reserves in any prorated limestone or sandstone field can best be made from pressure-decline relationships, once the type of reservoir control is established. The application of the involved formulas advanced for the pressure-decline methods require very complete data on production of oil, gas and water, initial and periodic pressures, initial and periodic gas-oil ratios, solution data, etc. Such information is available for only a few scattered properties which have been made the object of special research, and are sometimes not representative of entire fields or nearby tracts.

In this limited discussion it is impossible to give characteristics of all of the older Permian fields which would be useful in making comparative estimates for the newer reservoirs that appear to be somewhat comparable. For a quick survey, however, Table 1 is offered. This tabulation shows fields, their productive years, recoveries per acre to January 1, 1938, present potential of field, and average potential per well. The last two columns are given in order to indicate how close the respective fields are to approaching their economic limit, and how near their ultimate is represented in the recovery per acre column.

It will be seen that the Big Lake field of Reagan County has produced over 20,000 bbls. per acre from the Permian during its 14 years of productivity. Potential tests are not made periodically in this field, but its daily allowable of 5,100 bbls. is being made without difficulty. Most of the wells are now pumping.

The very cavernous nature of the producing section, and the highly effective water drive, at Hendricks, places this field in somewhat of a class by itself, but it is interesting to note that



Well No. 3 *Well No. 4*

Fig. 3—Showing variation in drilling time between offset wells. Initial productivities of these two wells reflected the differences in drilling time

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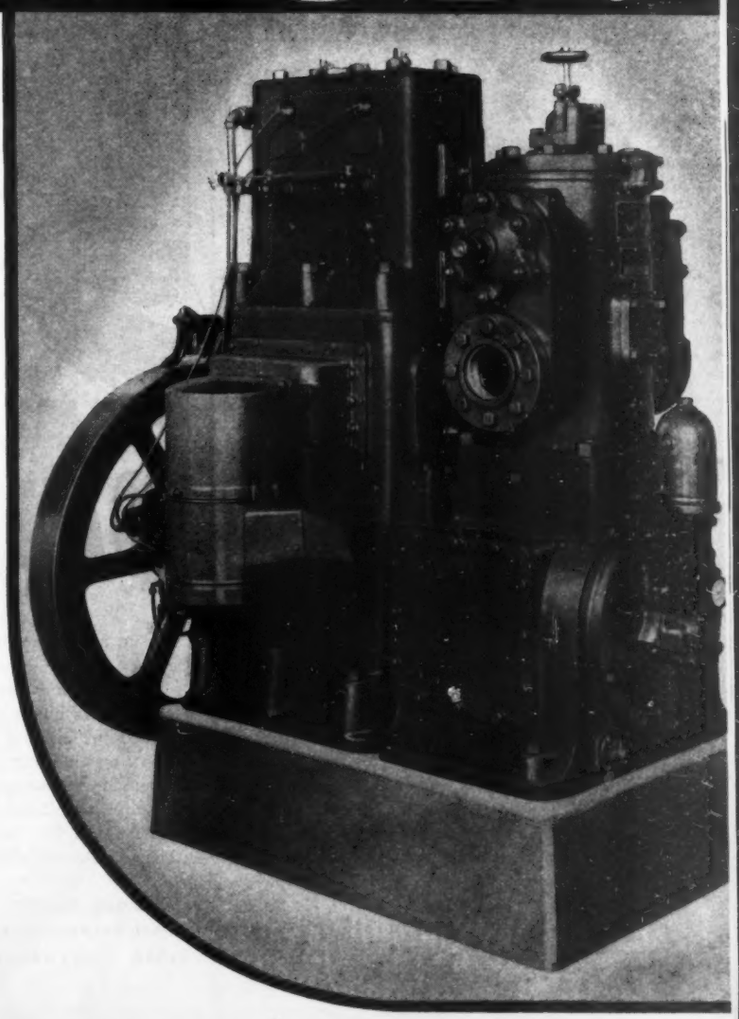

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over 20,000 bbls. per acre has been recovered there in 11 years. The field's present potential rate is 14,350 bbls., or an average of 36 bbls. per well. Very large quantities of water accompany the production. Any pressure-decline method of reserve estimating here would have been misapplied, as the well pressures have been held up substantially due to encroaching water.

The Penwell field of Ector County is more comparable to the newer type fields being developed along the eastern platform of the basin, where large quantities of free and solution gas are present. It is important to observe that a recovery of over 17,000 bbls. per acre has been made here in eight years, and the field's potential is now 51,071 bbls., representing an average of 310 bbls. per well per day. The recovery per acre figure is calculated by using only the actual developed and producing acreage, and not the apparent proven but present unproductive acreage. The initial pressure at Penwell was about 1,400 pounds. At the first of 1937 it was observed to be 868 pounds, having dropped 78 pounds during the previous 12 months while a total of 2,169,000 bbls. of oil was withdrawn. This represents an average of 27,115 bbls. recovery per pound drop in reservoir pressure. The Penwell field will apparently establish a very high recovery per acre before its depletion, and is offering impressive justification for the high ultimate recoveries being given such fields as Goldsmith, Harper, Foster and other Ector County pools.

The Church Fields-McElroy area of Crane-Upton County shows a recovery per acre of 8,000 bbls. after 12 years of life, at which time its potential is 130,000 bbls. daily, or a per well average of 500 bbls. The recovery per acre factor is not actually representative of the older and fully developed portions of this field, however, as the productive acreage in the Gulf-McElroy ranch, which is now so sparsely drilled, is included. One famous well in this field has itself produced over 6,000,000 bbls. It, of course, must be located in the past of a highly cavernous zone, or along a trend of decidedly high directional permeability.

Saturation and porosity in the Big lime at the Howard-Glasscock field occur as separate reservoirs on both the east and west sides, in depths of 3,000, 2,500 and 2,200 feet. These individual producing horizons have to date yielded about 7,000, 6,000 and 5,000 bbls. per acre, respectively.

The Yates field is, of course, in a class by itself from the standpoint of recoveries and potentials. It is interesting, however, to note a recovery of 11,750 bbls. per acre average in 11 years, from the Permian lime alone. At this time the potential of the lime area in the field is rated at over 8,000,000 bbls. per day.

It should be pointed out that these average

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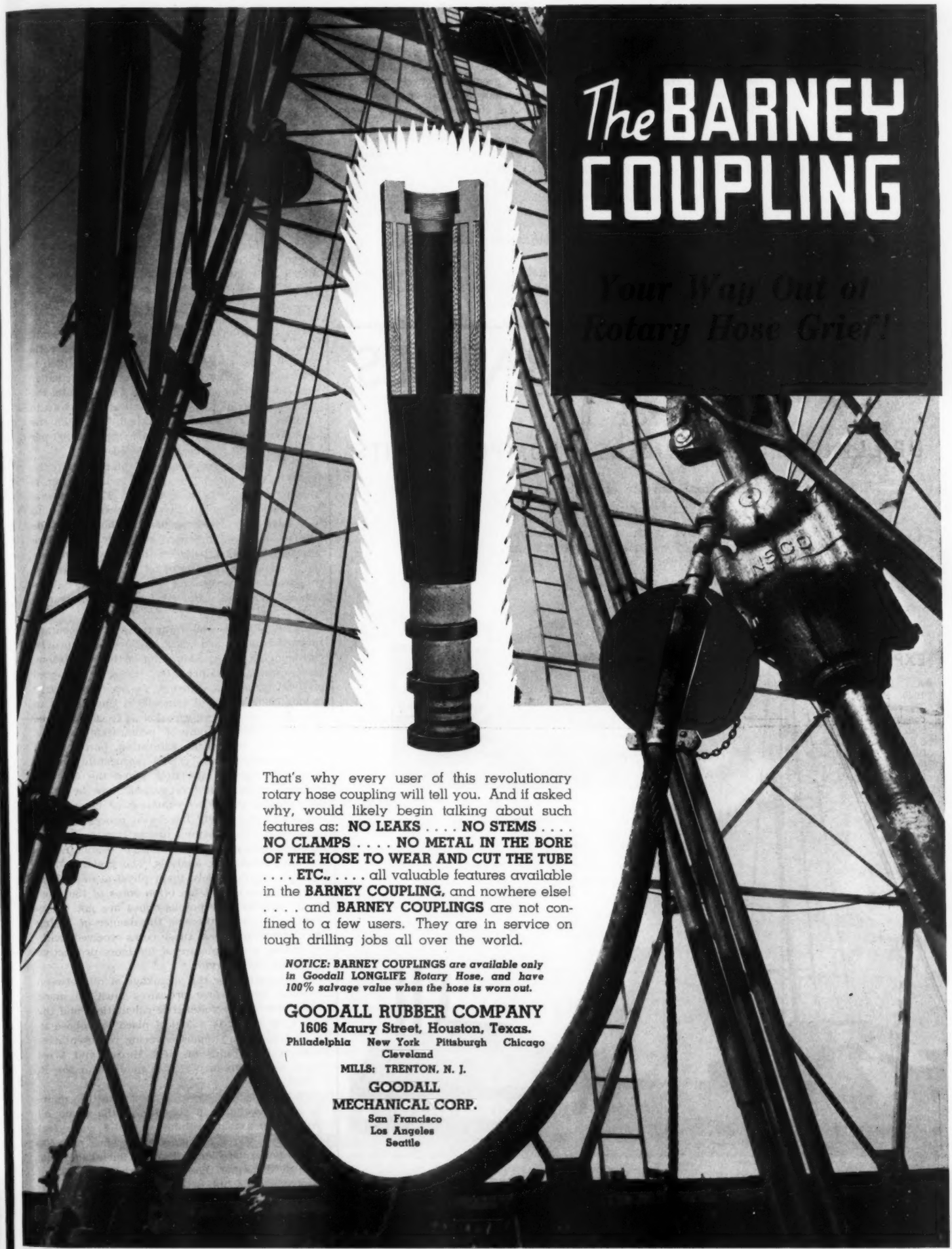
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figures are not representative of actual recoveries which have been produced from some of the better situated properties in the various fields, but are overall averages which include those leases with poor porous conditions, and low on structure. There are many instances on record where certain favorably situated leases have produced from 40,000 to 80,000 bbls. per acre from the Permian lime.

Submarginal Declines

Decline curves on limestone reservoirs usually permit reliable extrapolations into the future for reserve estimating purposes, if properties have not been restricted by proration. Even after 15 years, the only Permian field that may now be partially classed as "submarginal" is the Howard-Glasscock pool near Big Spring. Lease rate-cumulative or rate-time curves on the lime horizons of these depleted properties have been kept by several operators, and it is significant to know that only slight declines in the average production per well per day have been suffered since they reached the submarginal stage in 1932-34. Composite curves for the entire pool or individual pay levels in the pool would not be representative as a great deal of cleaning out, drilling deeper, and new completions, have been made in the area over the past few years. Therefore, only a few leases in the entire West Texas Permian Basin have declined to the point where their production rate will afford any indication of future yields. The oolitic limestone fields of southeastern Illinois have been producing commercial quantities of oil in the stripper stage for about 25 years.

Volumetric Calculations

To facilitate volumetric calculations in the porosity-saturation method of estimating oil reserves, the chart shown as Figure 1 is presented. Here the five variables: (1) Per cent of pore space; (2) per cent of saturation; (3) content per acre foot; (4) thickness of saturated section, and (5) percentage recovery, are readily combined to give the final reading in terms of "ultimate recovery per acre." Also, knowing the recovery per acre to date in any field, and by assuming the variable factors, the percentage recovery can be quickly observed from this graph.

The use of proper factors to apply in this simple graphic determination is, of course, the important thing in reaching a reasonably accurate estimate. Here again, the assumption of factors must be made in the light of past performances of older reservoirs, with the aid of all advanced practices of formation logging, and combined with good engineering judgment. When so made, a check or an average can be struck between the comparative estimate and the volumetric calculation to give a reliable figure of probable recovery for all practical purposes.

Saturation

By definition, the oil saturation of a certain core or horizon is understood to mean the ratio of oil by volume to the total pore space which is occupied by oil, gas and water in the particular core or horizon. Many variables enter into the determination of the proper saturation factors to employ in the volumetric method. Too often the impossible, but easily workable, factor of 100 per cent saturation has been employed.

The presence of connate water within the pore space, retained due to interfacial tension, is known in all Permian reservoirs. This ratio varies considerably, but inversely proportional to pore space. This seems logical, as the smaller the formation pores, the more effective will be the interfacial tension between the thin film of water around each particle of oil in the lime grains, thus a greater percentage of connate water. This volume must be deducted from any saturation factor used.

More accurate determinations of percentage saturation factor are being afforded by improved core analysis and the handling of the cores themselves. Core laboratories on trucks, or mounted on trailers, are in growing use in many active fields. Their principal purpose in the field is to provide immediate information as to casing seats, gas-oil contacts, extent of penetration to take, etc. Usually they make saturation, porosity and both directional and vertical permeability determinations right at the well. From the data assembled, permanent "coregraphs" can be made for a future guide in evaluation or reconditioning work. The newly developed process of canning cores under vacuum just as they come from the well, preserves them in their original form for later laboratory analysis. The greatest difficulty in relying solely upon physical data from core analyses is that too often cores of the most highly saturated or porous zones are not recovered. As a result, there is the danger of basing calculations upon just those cores received, without having a true picture of the more productive layers in the reservoir.

A correction for the shrinkage of oil between reservoir and surface pressures must be made somewhere in the volumetric calculation, and the saturation factor is a logical place to impose it. In an engineering report covering representative Permian lime fields of New Mexico and West Texas, U. S. Bureau of Mines publication No. R. I. 3316, says:

"Solubility tests made to determine the quantity of natural gas in solution in the crude oil revealed an average solubility of 670 cubic feet of gas per barrel of oil at a pressure of 1,400 pounds per square inch, absolute. Shrinkage tests made at the same time showed that, due to the dissolved gas, 1 bbl. of oil measured on the surface occupied space in the reservoir equivalent to 1.24 bbls., or 6.95 cubic feet."

Correcting for the connate water percentage, and the loss in saturated pore space due to shrink-

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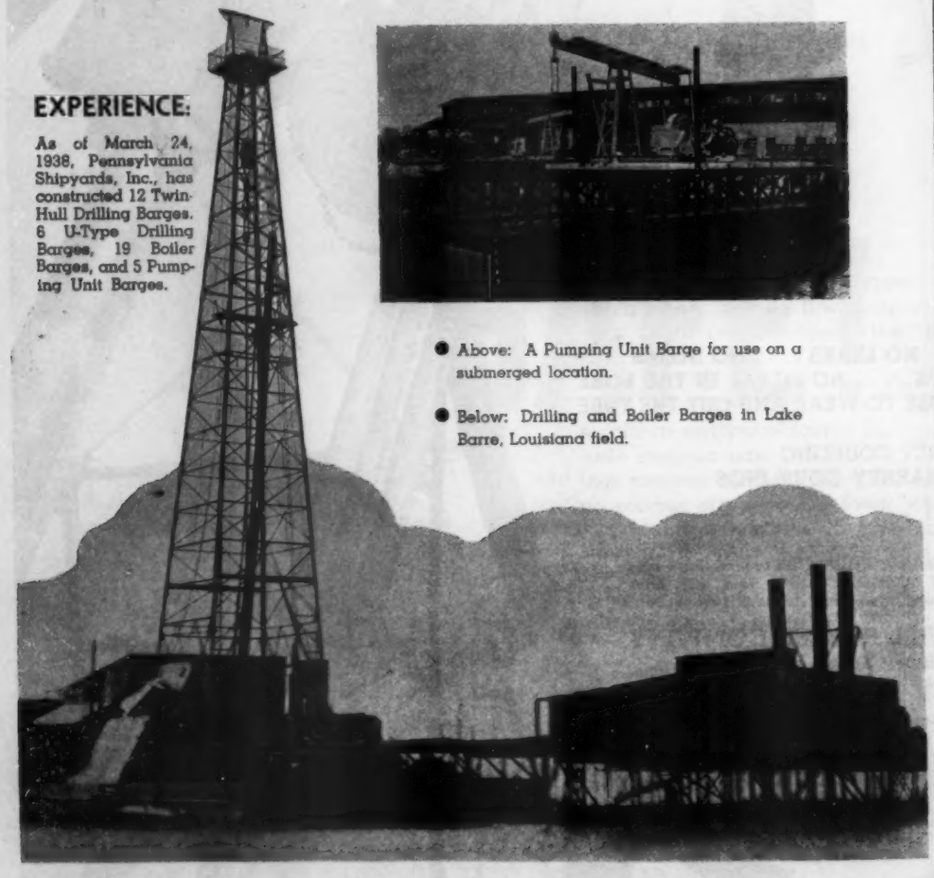
● Below: Drilling and Boiler Barges in Lake Barre, Louisiana field.



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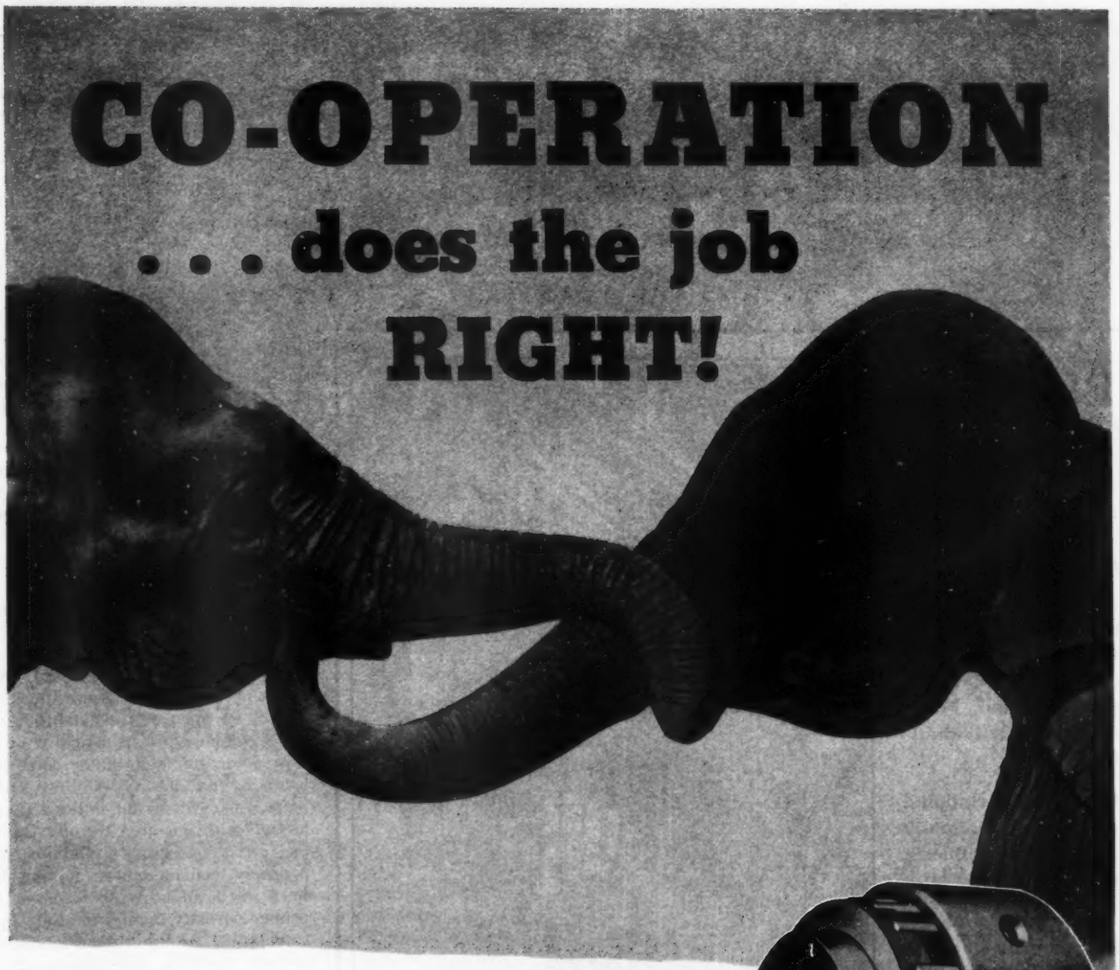

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TABLE 1—TABULATION OF RECOVERIES IN CERTAIN EARLY PERMIAN LIME RESERVOIRS OF WEST TEXAS

Field—	Productive years	Recovery per acre to Jan. 1, 1938	Present field potential from railroad commission schedules	Average potential per well
Big Lake (lime only)	14	20,700	(*)	.....
Hendricks	11	20,500	14,355	36
Penwell	8	17,000	51,071	310
Church Fields-McElroy	12	8,000	130,000	500
Howard-Glasscock, 3,000 ft.	12	7,000	.....	.....
Howard-Glasscock, 2,500 ft.	10	6,000	.....	.....
Howard-Glasscock, 2,200 ft.	9	5,000	206,645	1,430
Leck	10	6,500	1,407	145
Yates (lime only)	11	11,750	8,300,000	.....

*Allowable of field 7,500 bbls. daily; potentials not taken.

age, representative saturation values in Permian reservoirs range from 50 to 70 per cent.

Porosity

It would be utterly impractical to consider any average porosity factor for Big lime producing formations. The percentages of pore space, especially effective pore space, is known to vary widely within different pay zones of the lime, and between the same positions of each pay zone between wells. Hence, unless sufficient data are available to divide the section up into 1-, 5- or 10-foot intervals, and make physical analysis or have drilling time records, the porosity factor becomes a rough approximation.

The universal use of drilling time on both rotary and cable tool drilling in Permian wells is affording a much closer knowledge of porosities and net producing thicknesses. (See Max David's Southwestern Division A.P.I. paper on "The Use of Drilling Time in Determining Completion Practices," The Oil and Gas Journal, March 31 issue, page 69.) Mr. David says:

"Ultimate recovery from Permian limestone reservoirs is difficult to estimate with any degree of accuracy by the volumetric or oil in place method, on account of the lack of information regarding percentages of porosity. With accurate drilling time, the proper assignment of porosity percentages to equivalent drilling time, and the construction of bottom-water maps, it is believed that the volumetric method of estimating ultimate recovery in limestone fields still has great possibilities. To reach a higher degree of accuracy, more accurate and detailed information than heretofore obtained must be secured during drilling."

Figure 3 shows drilling time curves between offset wells, as taken from Mr. David's paper. Quoting further,

"As the drilling time indicates, well No. 4 was a much better well with respect to porosity than well No. 3. Both were treated with 5,500 gallons of acid in two stages. No. 3 tested at the rate of 1,900 bbls. a day and No. 4 had a potential capacity of 2,700 bbls. Well No. 4 had 77 feet of penetration, all of which was porous as shown by drilling time. Well No. 3 had 70 feet of penetration, of which 52 feet was porous as shown by drilling time. Well No. 3 had 37 bbls. potential per porous foot of pay whereas No. 4 well had 35 bbls. per porous foot of pay."

Acid treatment of Permian formation certainly increases initial productions, the extent of which usually depends upon the amount of relatively pure limestone present. Whether or not acidizing actually increases the ultimate recovery is still an open and debatable question. In those wells which show practically no fluid level before acidizing, and make good producers after acidizing no doubt definitely enlarges the ultimate. Also, where all indications point to an enlarged drainage area beyond the point of previous effective porosity, the ultimate recovery is properly considered as having been increased. Such facts must be considered in determining proper porosity factors to apply in the volumetric calculation. In one known laboratory experiment, a tight Permian core tested 7.23 per cent pore space before acid treatment, and 9.83 per cent afterwards. Due to effective channeling, the permeability of this same core was raised from .79 to 8.2 millidarcies. Figure 2 shows microphotographs of this Permian core before and after acid treatment.

A few of the known laboratory physical tests of the percentage pore space in various fields are as follows: Church Fields, 15 per cent; North Cowden, 19.9 per cent; South Cowden, 16.5 per cent. These particular values are considered rather high. Much production has been obtained from the Permian with considerably less percentage pore space. In the cavernous zones of saturation, the effective porosity to certain wells or on certain tracts is of course, substantially more than these representative tests.

Net Producing Thickness

Only that portion of the drilled formation which has exhibited sufficient porosity to yield oil should be included in arriving at the net producing thickness factor. In Permian sections it resolves itself into a summation of the total feet of porous and saturated pay which has been drilled, and not the total footage from the top of first pay to total depth. Drilling time again is the most reliable index to the proper value to use in this factor. Care must be taken to observe the water table if it is apparent, and not include any quickly drilled sections of porosity which may carry water in the total net producing thickness.

In arriving at the proper value to use as the

(Continued on Page 164)

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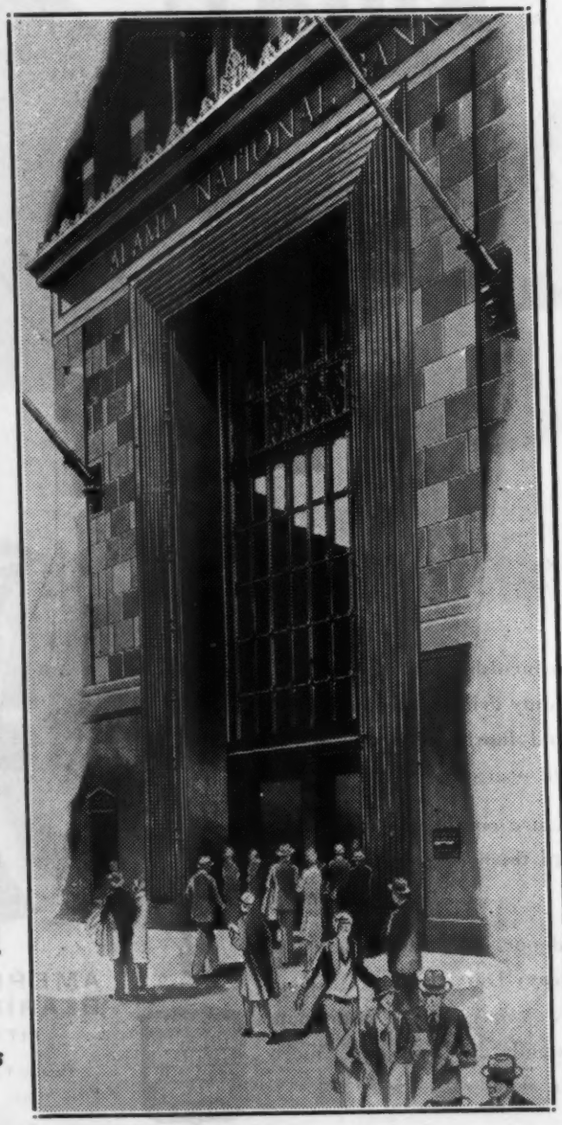

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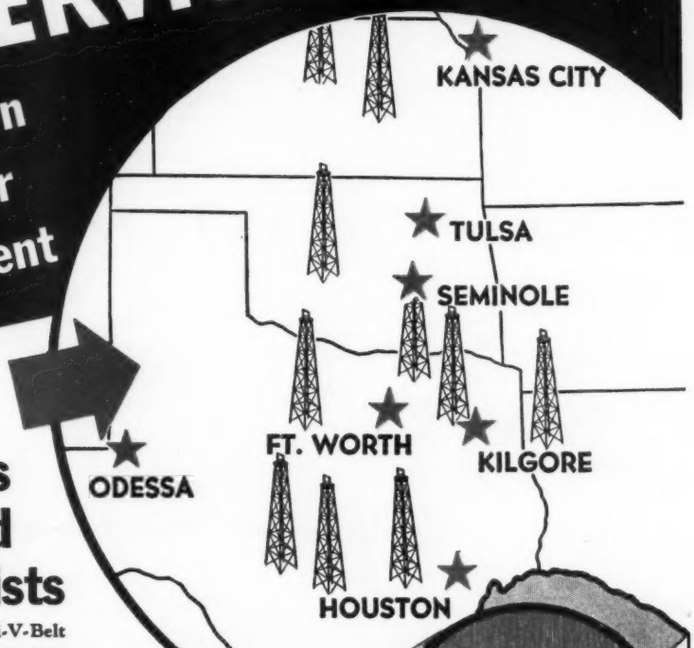

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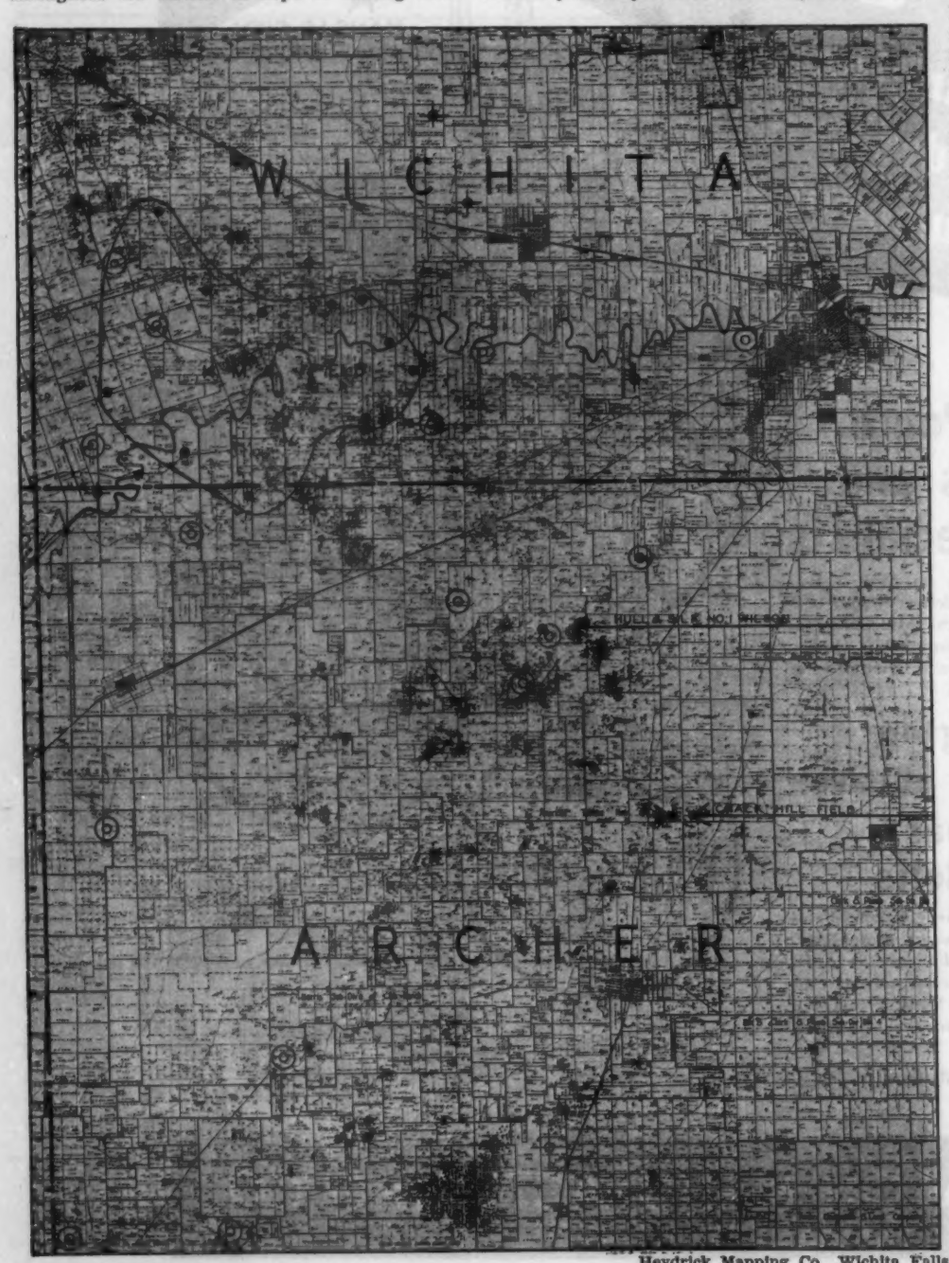
Active Search for Oil in K.M.A.

Turning Toward Deeper Pro

Although some North Texas wildcatters are still busy trying to define the productive limits of the 80-square mile K.M.A. field, many of them are now turning their attention to exploration throughout the district in hope of finding new fields in the deep K.M.A. lime oil-producing strata.

This movement has extended particularly into Archer, Wilbarger and Clay counties. It received a new stimulating force about the middle of March when a prolific producer was completed in this formation about 9 miles southeast of the southern limits of the K.M.A. field. L. V. Hull, W. W. Silk and Helmerich & Payne, Inc. No. 1 L. F. Wilson, NW SE section 25, A.T.N.C.L. Survey, was the discovery well in what has become known as the Panther area. After drilling a heavily saturated section of sandy lime in the lower Strawn (corresponding to the K.M.A. lime) from 3,841-58 feet, and testing for several days, an official gauge of 244 bbls. in 3 hours through ¾-inch tubing choke was established. This is at the rate of 1,952 bbls. per day. This well had the Ellenburger section of the Ordovician as its original objective, and to fulfill a 5,300-foot depth contract, they have begun drilling on No. 2 Wilson. It will be cored and tested through the Strawn zone, but will continue its exploration to the Ellenburger, and be plugged back if the lower zone proves nonproductive. Helmerich & Payne, Inc. have recently purchased the Hull and Silk interest in this well and part of the surrounding block.



Heydrick Mapping Co., Wichita Falls

Fig. 1—Regional map of Wichita and Archer counties, North Texas. The K.M.A. field is outlined by its outpost producers in all directions, and the enclosed proven area totals 80 square miles. The new deep Panther field in Archer County, and the deep Chalk Hill production to the southeast of K.M.A. is also indicated. The double-circled wells indicate wildcats rigging up or drilling to the K.M.A. lime throughout the territory. Important deep dry holes are also shown

The accompanying regional map shows the relative position of the Panther field to the K.M.A. field and surrounding tests. It will be noted there are 5 deep dry holes between K.M.A. proper and Panther, indicating there is no common connection between the two deep fields. It is the opinion of some, however, that a saddle or barren area exists between the two fields, but they will later prove all to be on one structure.

It is further interesting to note that the Chalk field is about 7 miles farther to the southeast of Panther. Lower Strawn production has been found here, and production is coming from two wells in this zone, as shown on the accompanying map. At this early stage of development the Chalk Hill. Panther and K.M.A. areas all appear to lie in a distinct northwest-southeast trend. The only other lower Strawn (or K.M.A. lime) production in North Texas is in the Rock Crossing field of Wilbarger County, and in almost direct line with the trend. It lies 20 miles farther to the northwest.

The search continues for additional fields in this horizon, and it will be noted from the outpost or wildcat drilling wells in the district (shown by double circle on the map) that tests are on the west, south and east side of the K.M.A. field, on all four sides of the Panther discovery, and spotted throughout the western half of Archer County. At the present time there are seven wildcats rigging up or drilling in Wichita County, five in Wilbarger County, nine in Archer County, and five in Clay County, all having production in the K.M.A. limestone as their objective.

K.M.A. Proper

In the meantime, drilling and activity in the K.M.A. field continues in boom proportions. With the present 162 wells rigging up, drilling, or in the process of completion, it remains the world's most active oil field. New locations average about 25 per week, and have done so for the past 90 days.

Total oil producers have increased from 89 at the first of 1938 to 234 on April 1, 1938, during which time monthly production has risen from 52,000 bbls. to the March figure of 285,000 bbls. March new completions numbered 72.

Since the potential factor was taken out of the allocation formula for this field, it is difficult to arrive at the field's potential, but it is estimated to be about 200,000 bbls. per day on April 1st.

Accumulated production from the deep horizon amounted to 1,710,581 bbls. on April 1. Figure No. 2 presents an historical chart of the K.M.A. deep

Area Now duction

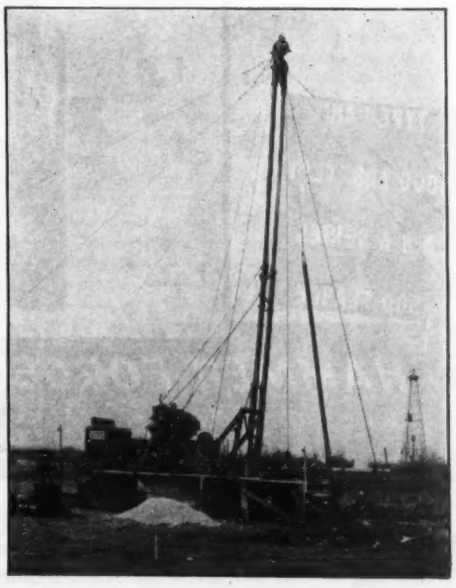
Deep Oil Development Co.'s lone injection well for its pressure maintenance project in Kemp City area near the discovery well. About 225,000 feet of residue gas per day is being returned to the formation at 1,175 pounds pressure. The gasoline plant as seen in the background provides the residue gas under pressure

field during its eight-year life, on which the very rapid rise in number of producers and monthly production is very noticeable.

The K.M.A. deep producers are now prorated upon a per well-acreage basis, having been changed from a potential-acreage basis on January 23, 1938. Each well is arbitrarily given a 29-bbl. daily allowable, and the acreage factor of 1.45 bbls. per acre is allowed up to the maximum of 20 acres. With a 29-bbl. allowable for acreage on a 20-acre tract, maximum allowable for any one well is 58 bbls. daily. Because of irregular occurrence of saturation in the 250-300-foot section of K.M.A. lime, producing depths vary from 3,700 to 4,000 feet, and to compensate operators for deeper drilling in some parts of the field, an additional 5-bbl. daily allowable is granted all those wells producing from below 4,000 feet. The total March allowable for the field was 7,595 bbls., and the April allowable is set at 9,789 bbls. to care for probable new completions.

Several large lease sales have been made during the past 60 days, many of which carry some sort of an immediate development clause. Inside drilling has fallen behind, as the producing limits have consistently been pushed outward. Also, certain of the independent operators in the district have been placing much of their resources into the purchase of outside acreage, and neglected some of their inside drilling. Within the 80 square miles or 51,200 acres area of the field which appears to be proven there still remain 2,326 wells on a 20-acre spacing pattern, or 4,886 wells on a 10-acre spacing pattern. to be drilled. It is now the apparent intention of most operators to drill on the 10-acre pattern.

At this time no entire side or portion of the field is defined by dry holes. The four deep dry holes to the southeast, and between the Panther area. apparently limit production in that direction but the extent of the nonproductive territory southeastward is by no means defined. In Figure 1. the outpost producing wells at K.M.A. are spotted in black, and serve as the estimated present proven area of the field. The two drilling wells shown to the east are in the testing stage, and may prove dry. The portions of the field which are considered "open" are to the north-northwest, and west. Two important dry holes, as shown on the map, serve to confine development in that direction, however. At this time the southern three-mile outpost in Archer County is indicating itself a possible producer while in the testing stage.



The new type trailer-mounted cable tool drilling-in outfit in K.M.A. preparing to bail

As yet the major companies who hold acreage within the proven area have been conspicuously absent in the drilling of either inside or outpost wells. Only Texas Co. and Humble Oil & Refining Co. have drilled inside locations. Magnolia, Shell Sinclair and Continental are slated to begin operations soon. K.M.A. is decidedly a field for the independents, and it is also to a large extent a field for the independents of Wichita Falls and North Texas.

The railroad commission has adopted the pol-

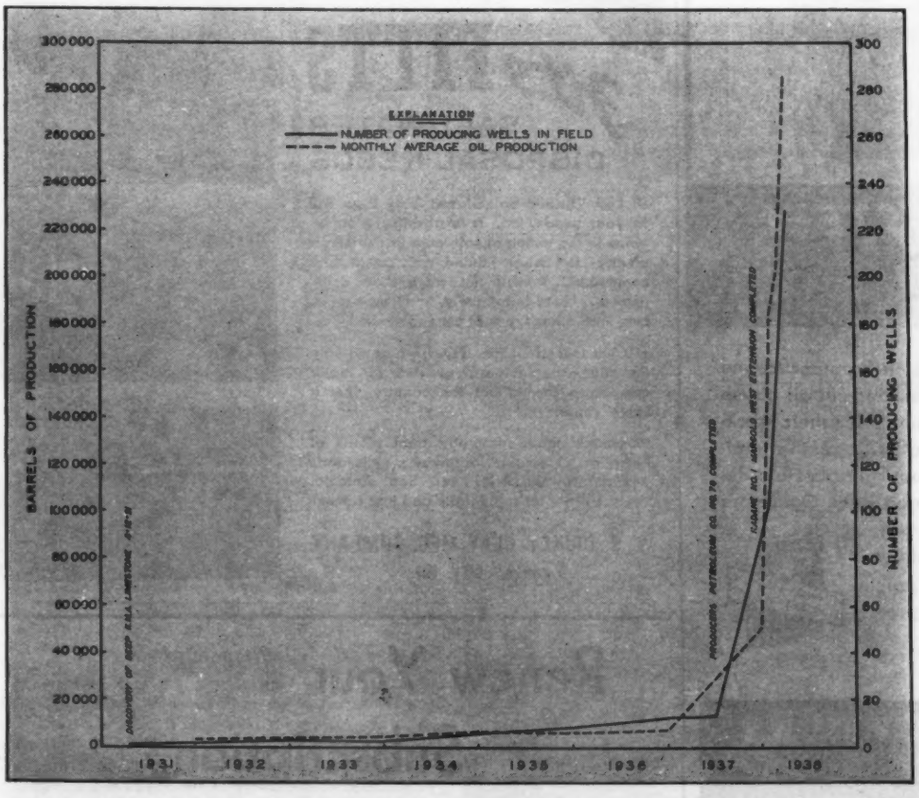


Fig. 2—Historical chart of K.M.A. field. Discovered as shallow producer November 10, 1919. At present the Cisco sands (400 to 1,700 feet deep) produce 925 bbls. of oil per day from 933 wells

icy of taking periodic bottom-hole pressure tests at key points every 60 days. Results vary widely throughout the field, and range from 1,450 to 1,900

Well-head hookup in the K.M.A. field. Flow beans are provided at most wells, and they are regulated to flow their allowed production throughout each 24-hour period

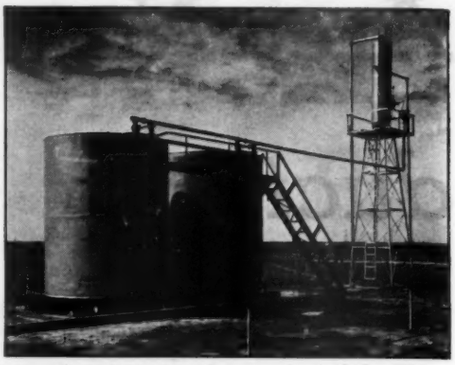
pounds, probably due to comparable variations in effective porosity of the surrounding areas.

A program of pressure maintenance seems assured for much of the field in the future. The Deep Oil Development Co. project, started about four months ago, has already begun to indicate results. Its No. 2 Munger, in the Kemp City area of the field near the discovery well completed in 1931, has been converted into the lone key well. About 225,000 feet of residue gas from the company's gasoline plant has been returned to the formation daily through this input well, at about 1,175 pounds pressure. Evidence of communication between offsetting wells has already been indicated.

Plans for two other gasoline plants have been announced for the field, although construction work on either has not yet begun. Phillips Petroleum Co. and Sunray Oil Co. will jointly build a plant, and Continental Oil Co. will begin work on a 15,000,000-foot gasoline plant soon, with auxiliary repressuring units included.

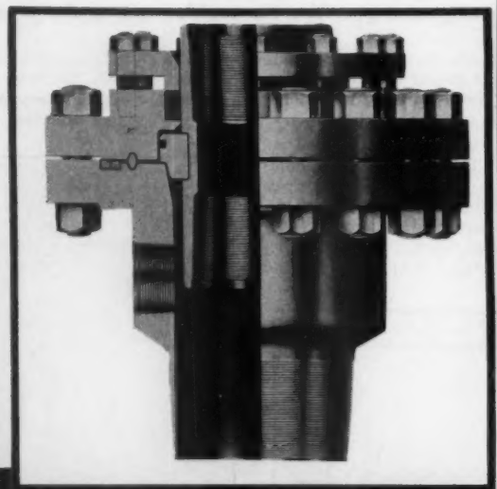
Drilling

The only important developments in drilling practice in this field has been in drilling-in procedure. Since the potential factor was removed from the allocation formula, there has been a tendency not to take so much penetration into the section, and to delay the application of heavy shots or charges of acid. Drilling time records are being kept on many wells through the pay section to afford data as to porosity, saturation, thickness, etc. Several wells have been drilled in with rotary tools, using oil as drilling fluid, and this practice promises to continue. A revolutionary type cable tool spudder, mounted on a trailer, has recently been introduced into the field for drilling in and clean-out work. A system of natural gas lines is being



In anticipation of additional gasoline plants planned for the K.M.A. field, it is becoming standard practice to elevate separators

laid throughout the field, making purchased gas available for drilling and lease operations. Most of the drilling continues to be done with diesel engines on portable or mechanical rigs.



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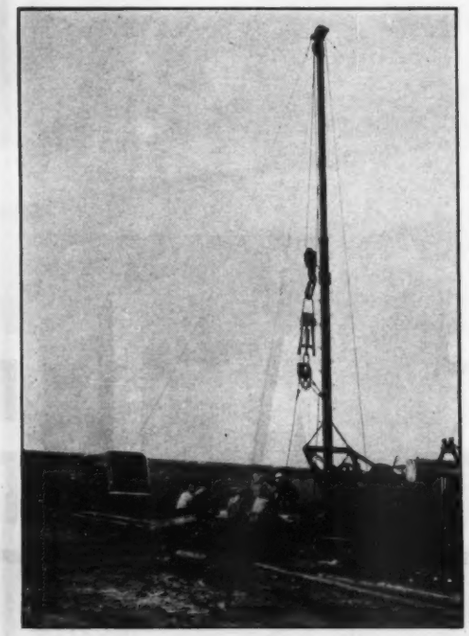
Natural Conditions Favorable to Drilling in Laredo District

By NEIL WILLIAMS

Shallow fields, easy digging formations and virtual absence of drilling and production hazards combine to make the Laredo-Government Wells district of Southwest Texas one of the most attractive in the state in which to operate. Although flush production of individual wells usually is not great, long life and consistent recoveries can be expected from the sands.

Conditions in the district appeal particularly to the smaller companies and independent operators, who, with light drilling equipment, are able to carry on their operations with a minimum investment.

Particular attention has been attracted to the district with the development within recent years



Gun perforating casing in well in Oilton field, Webb County, to be completed with portable completing outfit

of such fields as Government Wells, Loma Novia, Seven Sisters, Lopez, and Killam-Oilton. In daily production several of them rate among some of the more important fields of the state. Most of the older fields of the district have limited producing areas and total production has been relatively small.

Government Wells

Government Wells, the largest of these fields and the oldest, covers an area of more than 7,000 acres and has an estimated recoverable reserve of more than 75,000,000 bbls. Its 740 wells produce 12,000 bbls. daily. Loma Novia is slightly smaller in area but has approximately the same number of wells with a daily production of nearly 14,000 bbls. The other fields are appreciably smaller.

Killam-Oilton is one of the most recent additions to the district, being opened only last summer. It consists of two areas, originally considered separate pools, but these are being joined rapidly. Less than a mile now separates these areas. From the north end of the Killam area to the south end of the Oilton area is about 4 miles, and as the field is about a half mile wide the productive area totals approximately 1,280 acres. This has been one of the most active spots in the district. To date there are more than 180 producing wells with an allowable production of around 3,000 bbls. daily.

Only in a few fields in which development has been carried below the regular producing horizons of the district is production obtained below 3,000 feet. All the regular horizons, namely the Cole, Government Wells, and Mirando sands, are found within 3,000 feet of the surface, ranging in depth up to less than 200 feet in some fields. Loma Novia, one of the deepest of the typical fields, produces from depths of 2,600 to 2,700 feet. The Government Wells sand, the main producing horizon of the Government Wells field, is found around 2,300-2,400 feet in that field.

Due to the lenticular deposition, each of the main sand horizons in the district usually consists of several sands or lenses. Fields may produce from any or all of these sands, and in view of the number of sands, chances of finding production and opening new fields are materially increased.

No drilling problems of consequence are encountered in development. Formations throughout the district are soft and unconsolidated, lending themselves to rapid drilling. Although gas has been and is being produced in considerable volume in a number of fields, the gas is generally localized, and presents no particular hazard in development of oil production. What is present usually is in solution in the reservoir. Reservoir pressures are typically low, minimizing dangers of blowouts.

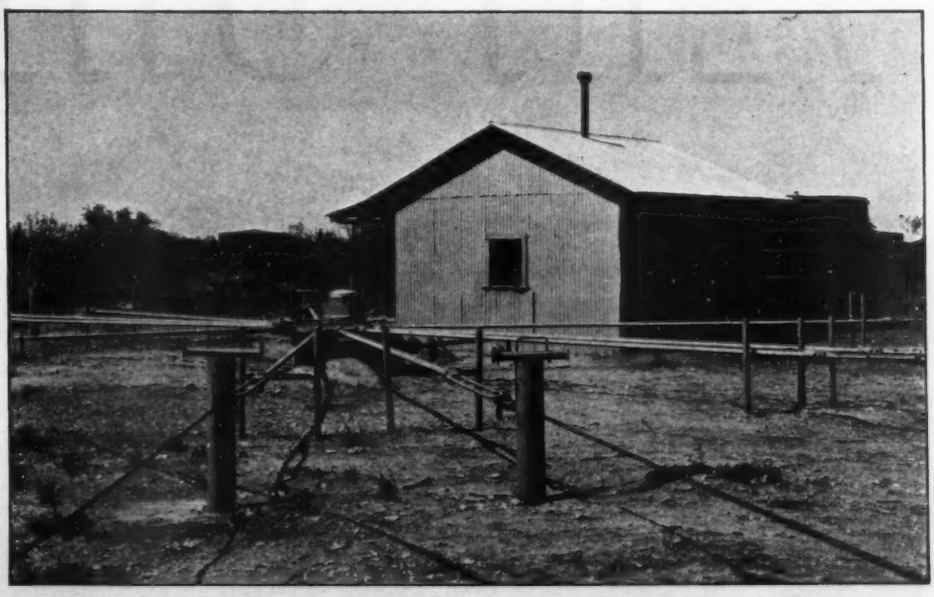
Shallow sands make unnecessary the use of any large, heavy equipment. Development, on the other hand, usually is facilitated by use of light equipment, which can be moved around readily and operated at low costs. Absence of high pressures or other hazards eliminates the need of special facilities or practices for the prevention of blowouts, as is the case in many other areas of South Texas. Cellars or substructures are uncalled for in setting up rigs.

One of the few problems faced is scarcity of good water. Only in some of the fields is an adequate supply of water available for extensive development. This has handicapped the operation of steam rigs. As a result a large number of mechanical rigs have been and are being used, particularly on outlying and wildcat tests. These generally are powered by small gasoline engines. Electric motors have been used in some cases. In one instance, diesel electric rigs were used, a central power generator installation being made for a group of wells drilled with small electric motor rigs.

Frequently, rigs assembled out of miscellaneous antiquated units answer all requirements. Old pulling units equipped with sprockets for chain drive to the rotary have been provided for drawworks on many rigs. On some rigs, light water pumps answer for mud pumps. Seldom are rigs subjected to great loads or emergencies, and for this reason, equipment discarded from old rigs sometimes is adequate.

However, most of the larger companies operating in the district, and some of the smaller ones, are providing new, modern, although light, rigs and equipment. They are finding that good equipment often means savings to them in lessening shutdown time for repairs and replacements.

Typical of development practices followed in



New gas engine central power installation in Oilton field, Webb County. Twelve wells are to be pumped

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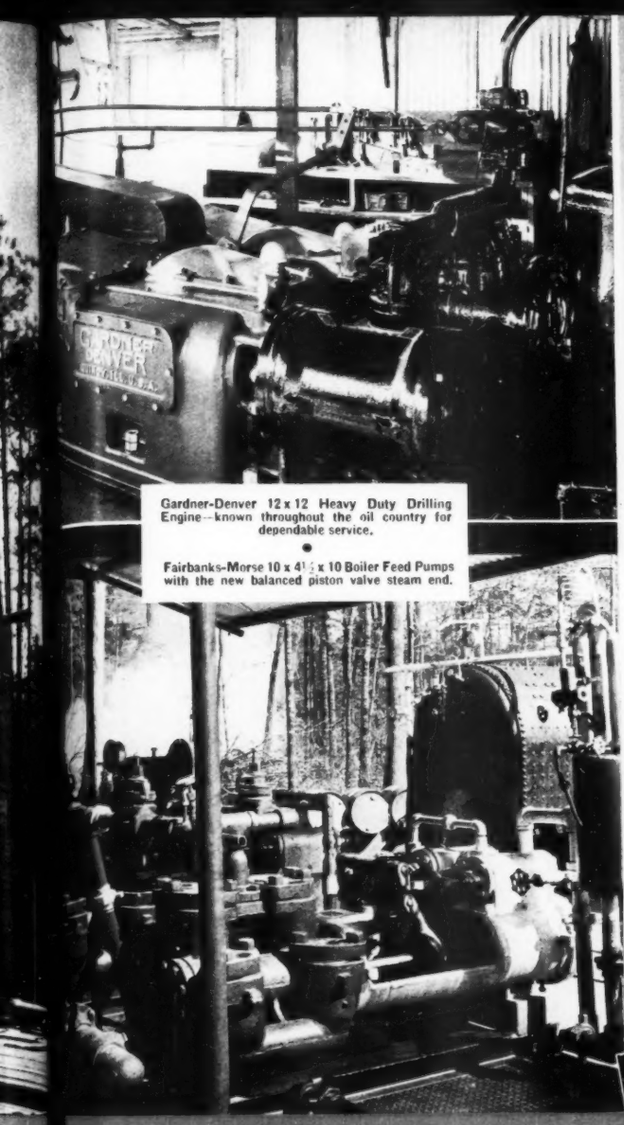

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A battery of Farrar & Trefts 125 h.p. 350 lb. W. P. Boilers in the Schuler, Ark., field.

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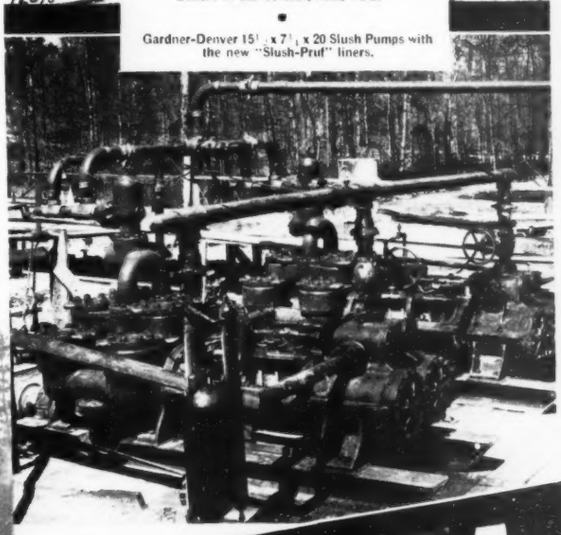

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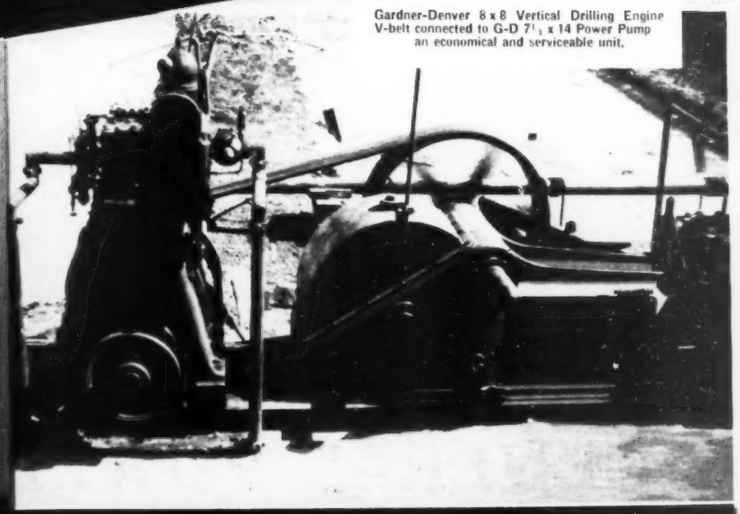

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various fields of the district are those now being carried out in the Killam-Oilton field. Production in this field happens to be from the Mirando horizon. Three sands in this horizon between 1,900 and 2,000 feet are producing at different places in the field.

In this field approximately 80 feet of 8-inch pipe usually is set and cemented for surface protection. Open hole then is carried to the sand, in which 5½-inch casing is cemented for flow string. Some holes are drilled sufficiently large for 7-inch casing, but as it is not believed there will be any early need of deepening the wells, most operators prefer to save the difference in cost of the two strings. Approximately 50 sacks of cement generally are sufficient for cementing.

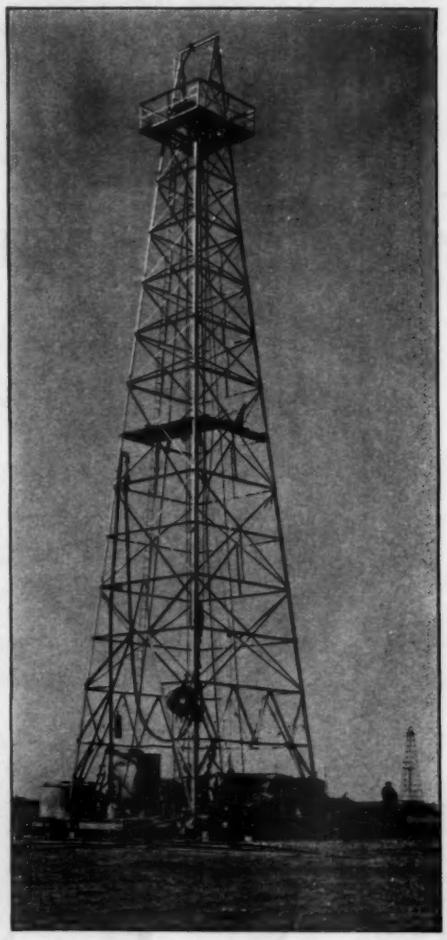
Some of the operators in this field, as in other fields, follow the practice of setting this casing through the oil section and then perforating for completion. Others prefer to set on the sand in the old conventional manner. In either event, cement is allowed to set 48 hours.

Time required for drilling and running casing usually is less than three days. As in most fields of the district, formations are so soft that holes are practically washed down. In the absence of gas blowout hazards or hole difficulties, no particular precautions have to be taken in drilling that would slow up operations. Light weight, thin drilling fluids facilitate fast drilling. Wells are drilled to the sand without coming out of the hole with the pipe after surface plug is drilled.

Moving Time Speeded Up

It now is becoming fairly general practice not only in this field but in development of proved areas in other fields of the district to move the drilling rig off a location as soon as the flow string has been cemented. This minimizes the amount of idle time for a rig because while the casing is setting, the rig can be making hole on the next location. Moving a rig from one location to another in proved areas is only a matter of a few hours. It is the practice to have these light rigs and derricks on skids (which provide adequate foundation for such shallow drilling) and with a tractor, or sometimes just a truck, they can be skidded easily without tearing them down.

Wells on which the drilling rig has been moved off, usually are completed with a unit consisting of a pulling unit and a mast mounted on a truck, which follows up the drilling rig. When cement sets, this unit is moved in, and with it the cement plug is drilled out and the well brought in and completed. One such unit and one drilling rig can keep about even, considering the rate at which wells are drilled.



Typical drilling rig set-up in Laredo district—Oilton field, Webb County

For those wells in which casing is run through the oil section, gun perforators generally are used, 12 shots being the customary number of perforations. Tubing then is set and a small well head connection made to complete and tie the well into the flow lines. Wells, in which casing is set on top of the sand, are completed with a joint of perforated pipe being set in the sand using a lead seal. Three-sixteenths inch perforations are customary in the Oilton field.

Costs of a completed well in this field run from about $5,000 to $8,000, depending largely on the pipe and equipment used in completing. Well connections are inexpensive as only simple, low pressure test heads are needed, but most operators find it expedient to use only good, new casing.

Pumping Methods

Most of the wells in the Oilton field are good for about 100 to 125 bbls. daily at time of completion although under proration they are allowed to take less than 20 bbls. daily. Due to the low pressures flowing life is short and most wells are placed on the pump at completion. As the wells go on the pump at or soon after completion, small individual pumping units usually are installed, some being driven by gas engines and some by electric motors. In some instances two or more wells are pumped with backside connections to jacks. With the drilling up of the field, some op-

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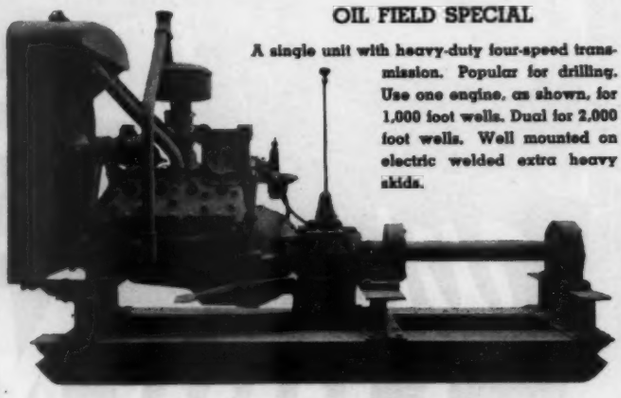

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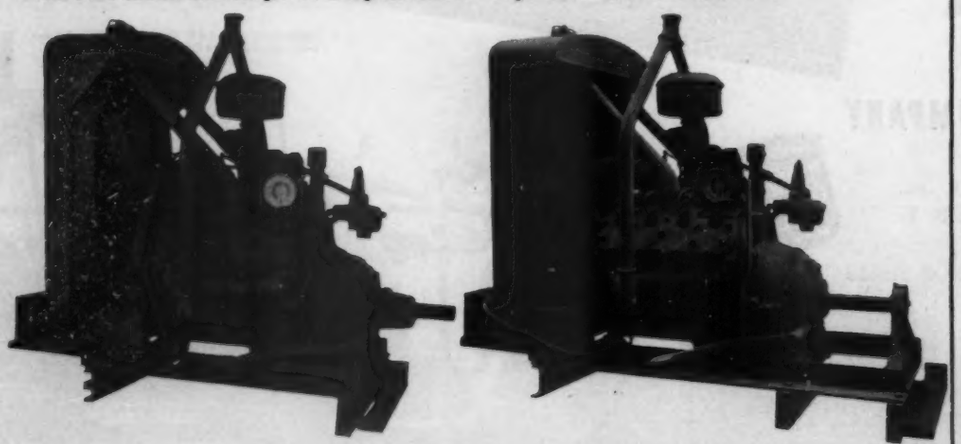

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erators are replacing these individual units with central power installations. New, modern equipment is being used for this.

All types of pumping equipment are used in all fields of the district. While in some of the older fields, and on leases of some of the smaller operators in the newer fields, makeshift equipment is being operated, for the most part modern, efficient practices are being followed.

In fields where gas is available, gas lifts and flow valve installations are finding increasing adaptability. Among these fields is Lopez, where one of the principal operators has equipped all its wells with gas lift. Reservoir pressures of the Lopez field are above the average in the district, and as sufficient gas at present is being produced with the oil to operate the lift, a high degree of efficiency is being attained in production of the field. The field is one of the few in the district to have a well defined gas cap, which provides a reserve of gas for use in future gas-lift operations.

On many wells, particularly in such fields as Lopez, Government Wells, Loma Novia and a few others, installation of artificial lifting equipment is necessary only to agitate the wells. A large number of wells still can flow naturally if allowed to produce steadily but due to the low reservoir pressures and lack of gas, do not have sufficient pressure to kick them off. Due to low proration allowables, however, it generally is impossible to produce these wells steadily more than a few hours at a time. In most instances the allowables are produced within a period of less than three to four hours each day, and the remainder of the time the well is shut down.

PERMIAN LIME RESERVOIRS

(Continued from Page 152)

"percentage recovery" factor, here again the 15 years' productive background must be drawn upon.

It would be very interesting and instructive to calculate the percentage of recovery of these various older Permian reservoirs. Sufficient data are not available from early logs to give net acre feet of pay, or other factors, but for the sake of investigation a few approximations may be made. For the Penwell field, conservatively assuming a 15 per cent porosity, 60 per cent saturation, and 40 feet of net thickness, a percentage recovery of about 40 per cent has already been obtained. After having assumed these factors, chart in Figure 1 may be used in estimating percentages of recovery. The Hendricks field is thought to have had a recovery of from 50 to 75 per cent, due to its highly effective water drive. These high recoveries are perhaps the exception, but they give some justification for the conservative factors of from 20 to 40 per cent which are often used.

Percentage recoveries from an oil-bearing reservoir are affected by several important physical and operating conditions. In gas drive fields recovery has been limited in the past because all or most of the energy was spent before all the oil was moved into the well bore. In water drive fields, recovery has been limited due to by-passing of encroaching water, if producing rate has been too rapid. Pressure maintenance and good operating practices as employed today are doing much to increase the percentages of recovery in both types of reservoirs. Early estimates of probable percentage recovery are indicated by initial pressures, gas-oil ratios, establishment of an effective water drive, and other like data. Drainage areas, well spacing, viscosity of oil, and efficiency with which reservoir energy is being conserved and utilized, must all be considered in the section of a proper percentage recovery factor.

Bureau of Mines Analysis Crude From Ramsey Pool of Oklahoma

The crude oil produced from the discovery well in the new Ramsey pool, Payne County, Oklahoma, is an intermediate base oil similar to that produced from the Wilcox sand in the Seminole, Oklahoma, area, according to an analysis by the Bureau of Mines Petroleum Experiment Station at Bartlesville, Okla., maintained in cooperation with the state of Oklahoma. The gravity of the sample is approximately 43 degrees A.P.I. and the sulfur content 0.18 per cent. The lighter fractions include 39 per cent of "gasoline and naphtha" and approximately 10 per cent of kerosene distillate. The remaining distillates, consisting of 28 per cent of gas oil and heavier distillates, give indications that the oil will yield approximately the same type of products as are obtained from Seminole crude oil.

Typical electric motor driven pumping unit with take off to pumping jack—Oilton field, Webb County

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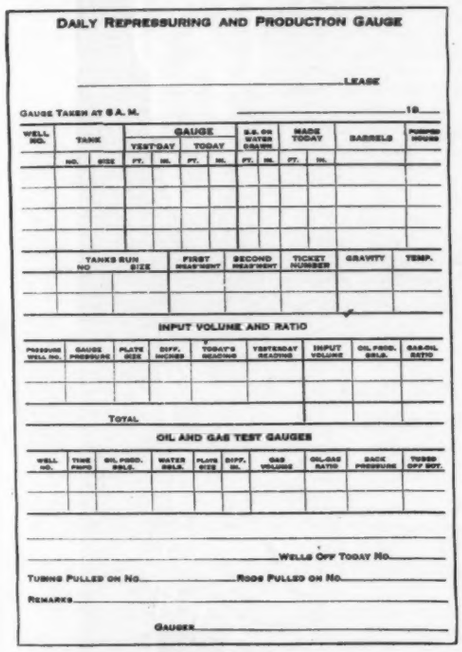
Repressuring Important Means of Producing Oil in Texas

The great stripper well area of North Texas, comprising some 16,000 producing wells, which yield an average of about 60,000 bbls. of oil daily, still represents an important portion of the production and reserves of Texas, even after approximately 20 years' producing life.

Perhaps the chief reason why this territory has maintained and strengthened its position is that about two-thirds of all producers now are operating under some form of secondary recovery. A great majority of the new producing areas discovered in the past few years have been placed under



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WELL NO.	TANK		GAUGE YESTERDAY		GAUGE TODAY		B.S. OR WATER GAUGE		MADE TODAY		BARRELS	PUMPER HOURS
	NO.	SIZE	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.		

TANKS RUN NO	SIZE	FIRST MEASUREMENT	SECOND MEASUREMENT	TICKET NUMBER	GRAVITY	TEMP.

INPUT VOLUME AND RATIO

PRESSURE WELL NO.	GAUGE PRESSURE	PLATE SIZE	DIFF. INCHES	TODAY'S READING	YESTERDAY READING	INPUT VOLUME	OIL PROD. BBLS.	GAS-OIL RATIO
TOTAL								

OIL AND GAS TEST GAUGES

WELL NO.	TIME PROD.	OIL PROD. BBLS.	WATER BBLS.	PLATE SIZE	DIFF. IN.	GAS VOLUME	OIL-GAS RATIO	BACK PRESSURE	TUBED OFF BOT.

WELLS OFF TODAY NO.

TUBING PULLED ON NO. RODS PULLED ON NO.

REMARKS

GAUGER

Fig. 1—A representative daily production and repressuring record as maintained in North Texas fields. Such detailed daily records serve as a basis for periodic checks of secondary recovery installations

a pressure maintenance program soon after they were developed, while pressure restoration has become almost standard practice on the vast number of producing leases in the old fields.

Of the 15,924 stripper producers in the North Texas district some 14,300 are submarginal, and show an overall average of 3.88 bbls. per well daily. Roughly, 10,000 of these wells are under some form of repressuring. Due solely to this fact, the daily average production per well in the district has not only been maintained but actually has been increased in the last few years.

This extensive area under secondary recovery might be extended to include the stripper regions of central Texas and southern Oklahoma, which are likewise operating under the beneficial methods of secondary recovery. Only the North Texas district proper will be considered here.

It is significant that in all pools the lease ownership is widely diversified, held largely by small independent concerns. The inability to unitize properties within a common reservoir often has prevented employment of repressuring in other areas. In North Texas the probability of production losses across property lines is prevented by carefully spacing input wells and regulating input volumes at critical points.

Independent producers often do not resort to pressure restoration on their properties because they do not maintain an adequate engineering force to plan and supervise the various projects, and the extent of their properties does not justify such an organization. This problem is met throughout the entire southern Oklahoma and North Central Texas area by engaging consultants who, on a retainer basis, appraise the properties, design the installation, and supervise its operation until results are definitely established. During this time also the pumper and field men are educated in control of the input gas, the keeping of full and accurate daily lease records, and other necessary details. The consultants often are reemployed at intervals to examine operations and suggest plans for the future. The full data maintained daily during the engineer's absence affords a reliable basis for this checking. Figure 1 illustrates a typical lease daily report which contains the necessary production information.

Input Well Positions

In typical shallow fields of North Texas structure may be ignored and pattern alone considered in the selection of input or key wells. Wherever possible an attempt is made to have an input well offset each producer, which requires a ratio of about one key well to each five producers. Care is exercised to see that input wells are located as far from property lines as practical and still maintain the desired pattern. Where it is deemed necessary to locate a key well near an adjoining lease the input volumes are controlled carefully to prevent any movement of oil beyond the owner's line of producing wells.

Mechanics of Operation

The actual mechanics of repressuring does not differ greatly from that of other districts. Perhaps the most important difference is that orifice flanges are placed in the casinghead gas gathering lines of each producing well in order to measure gas and gas-oil ratios of each small well. Although this entails some work and expense on leases containing many small producers, the additional control afforded by the full information of reservoir performance has proven worthwhile in checking any tendency to channel and in determining proper input volumes and production rates.

Pressure Maintenance

It is now the general practice to set a gas-compressor on newly developed leases at the same time power is set, and begin a program of pressure maintenance at as early a time in the field's life as possible. In certain instances the compressor is operated from the lease power engine.

An outstanding example of this practice is in the flush K.M.A. field, where one producer in the Kemp City area recently was converted into an input well. About 225,000 cubic feet of gas is being returned to the formation daily here at a pressure of 1,175 pounds. Indications of communication between adjoining wells, and resulting benefits, have been noted after only about six months' operation.

The Chalk Hill field is another excellent example of a field which has enjoyed the benefits of pressure maintenance from the beginning. After discovery in 1929 initial repressuring operations were begun in early 1930. There are now 40 producers and 6 key wells in the 2,200-foot Canyon

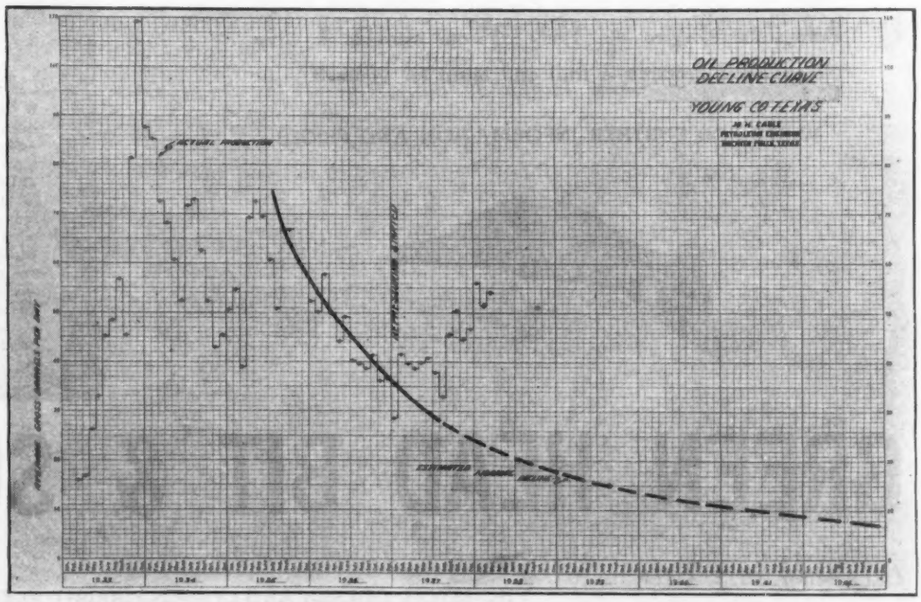

Fig. 2—Record of a six-well repressuring installation, costing $500. Note 25-bbl. daily increase in production, a restoration of the 1935 level, and a conversion from stripper to prorated production

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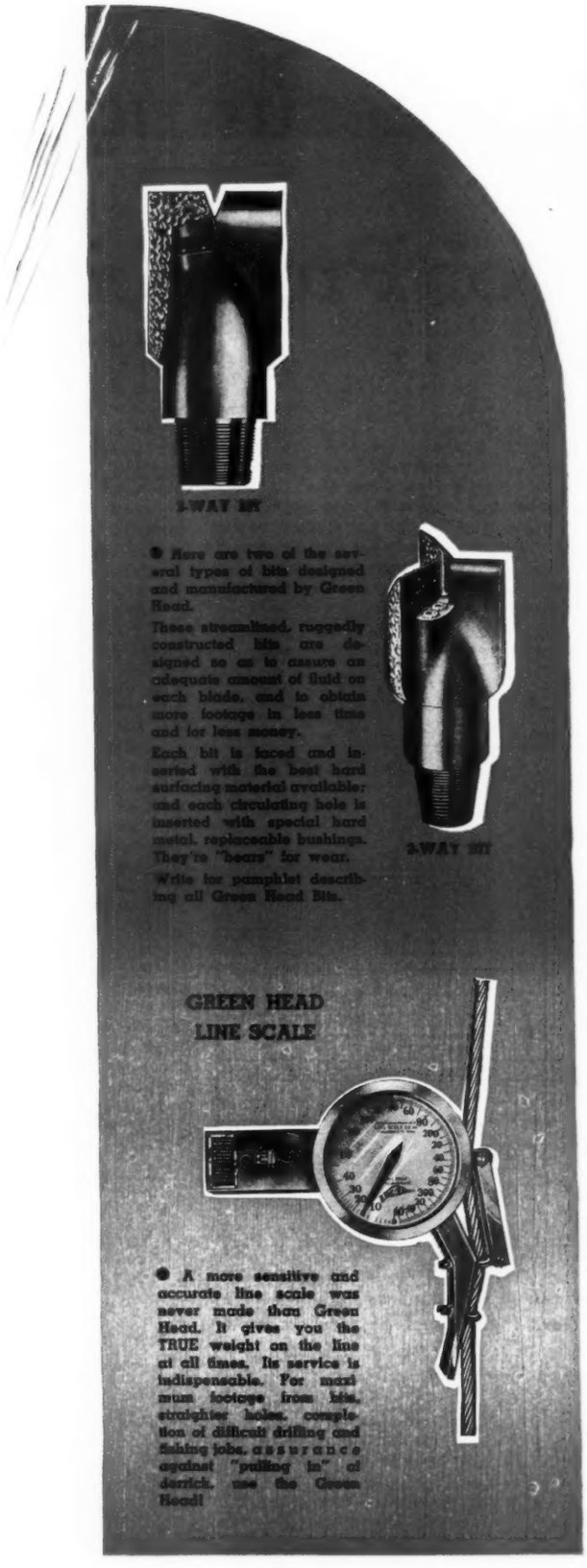

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SCOTT, LOUISIANA

sand in this field. Input volumes have been increased from 500,000 cubic feet per day originally at 1,100 pounds pressure to the present injection rate of about 2,000,000 cubic feet daily. Compressing equipment is included with the lease gasoline plant. The production rate has been well sustained, and the field has not declined to the marginal stage after nine years of producing life.

A majority of repressured fields in North Texas have been in the shallow Gunsite sand, which is a body of rather uniform and high porosity. It occurs in flat structures, and contains a rather high degree of saturation.

The Campbell field in Archer County, east of Olney, offers a good illustration of a 900-foot Gunsite sand field under pressure maintenance since its discovery. Ninety acres of the Campbell lease was developed in 1935 with a total of 35 wells, and compressor was set in May, 1936, for repressuring purposes. The wells ranged from 10 to 350 bbls. per day initially, and had rather high fluid levels, but they were equipped to pump upon completion. Gas-oil ratios of about 200 to 1 were exhibited, and only that gas recovered from the lease gun-barrel was returned to the formation. A back pressure of 15 to 25 pounds is maintained at the casinghead to prevent the production of any more gas than is absolutely necessary. Up to the present time it has not been necessary to purchase outside gas for fuel or injection purposes. The 150,000-foot compressor has not been taxed to capacity, and injection pressures have dropped from 250 to 100 pounds, indicating perhaps that gas has not been returned to the sand as fast as volumetric withdrawals have been made. About 95 per cent of the gas production on this lease to date has been utilized. All gas not used for fuel has been returned to the sand, totaling about 32,000,000 feet in all. The production rate has been well sustained and the property is still well above the marginal limit, so no significant decline curves can be presented. Additional gas probably will be purchased and added to the injection volume soon.

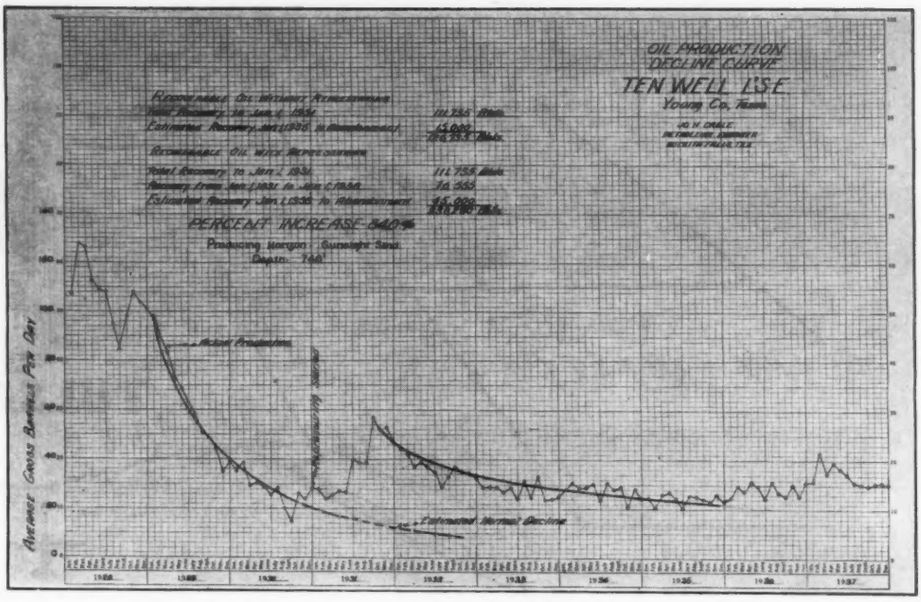

Fig. 3—A 10-well property in northern Young County, showing a constant or increasing rate of production over the last seven years during repressuring

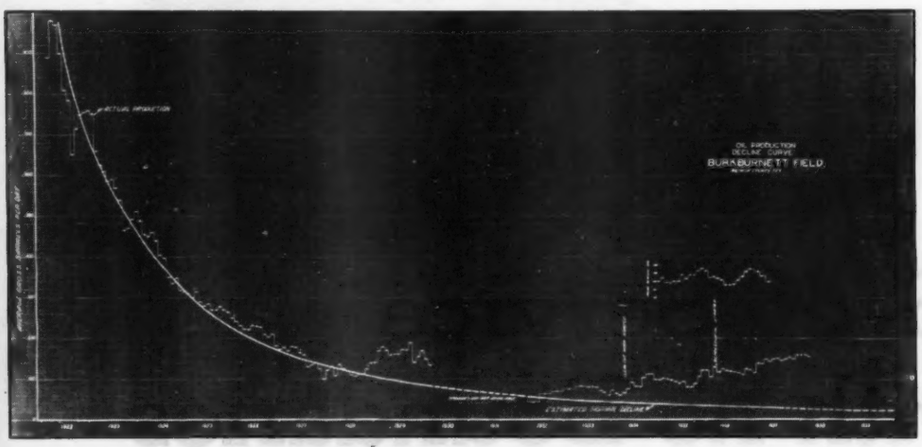

Fig. 4—A 17-year producing history of a 42-well lease in the townsite area of Burkburnett, where repressuring was applied after pulling high vacuum for many years

The Portwood field on the Archer-Baylor County line, where the Gunsite sand at about 1,450 feet has been repressured since shortly after its discovery, presents another interesting example, and it permits some calculation of the actual benefits derived. In normal decline without proration and consequent pressure maintenance in such fields in this territory about 45 per cent of the oil is produced during the first year of producing life, 22 per cent the second year, 15 per cent the third, etc. The 100 wells in the field, comprising 300 acres and having 20 input wells, were made the site of a pressure maintenance installation three months after development. During the first 18 months slightly over 1,000,000 bbls. was produced from the lease under proration. Under normal decline this would have represented 45 per cent of its total ultimate expectancy without the aid of repressuring, or a total of 2,225,000 bbls. However, on the decline-curve basis, it is estimated that owing to the aid of repressuring, the property will yield 4,000,000 bbls. ultimately. To date over 2,000,000 bbls. has been recovered, and the daily prorated production is 1,260 bbls.

It is interesting to note the percentage recovery from this property with and without the aid of repressuring. Using the assumed factors of 24 per cent porosity, saturation 65 per cent (1,240 bbls. per acre foot), and a 25-foot net saturation thickness, a yield of 2,225,000 bbls. from the 300-acre tract would have represented a 24.5 per cent recovery. Applying the same factors to the indicated 4,000,000 bbls. ultimate under pressure maintenance, a percentage recovery of 43.9 is shown. Usually increases in ultimate recovery due to repressuring range from 50 to 100 per cent, with a few instances where over 200 per cent has been obtained.

Throughout the district many examples are available of stripper properties which have reponded readily to the restoration of gas pressure in the reservoir. Figure 2 presents an illustration of a six-well lease in Young County which is particularly interesting when it is known that the total cost of this repressuring installation early in 1937 was only about $500. Production has increased steadily since repressuring began until the 1935 rate has been established again and the property has been converted from a marginal lease to the point where now it must be prorated. A 15-horsepower engine was pumping the power on this six-well lease, and a 4½ by 4-inch compressor was added for compression purposes. Formation gas is used for injecting, and purchased gas is used for fuel requirements only.

The producing history of another 10-well lease in northern Young County is given in Figure 3. It

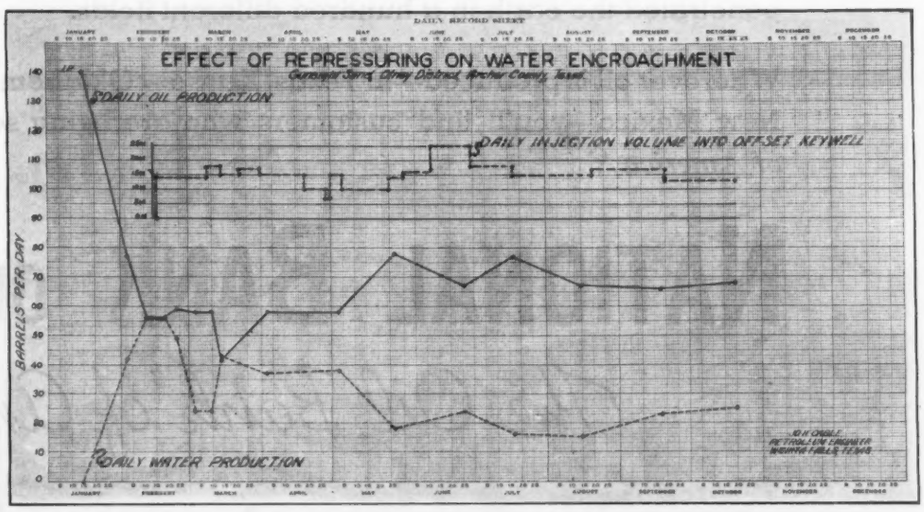
EFFECT OF REPRESSURING ON WATER ENCROACHMENT
DAILY OIL PRODUCTION
DAILY INJECTION VOLUME INTO OFFSET KEYWELL
DAILY WATER PRODUCTION
BARRELS PER DAY

Fig. 5—Illustrating the beneficial effect of repressuring upon water encroachment when applied at the proper points

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will be noted that this Gunsite-sand field followed a normal decline for three years, falling off rapidly from 128 to 24 bbls. daily. The production rate responded rapidly to repressuring at the opening of 1931, and has remained practically constant for the past six years. It is estimated that the ultimate oil recovery without repressuring would have been 126,735 bbls., while the ultimate under repressuring is indicated to be about 233,290 bbls., or an 84 per cent increase due directly to the restoration of pressure.

Repressuring After Vacuum

Figure 4 sets out the 17-year producing history of a 42-well lease in the townsite area of the Burkburnett field in northern Wichita County. This is particularly interesting because high vacuum was applied to these wells and all surrounding properties early in their life, and still is being pulled. Production declined from 1,000 bbls. to 100 bbls. daily during the first eight years, and at the opening of 1928 the original owners began a partial program of repressuring. Figure 4 shows substantial results were achieved over the next two years, and until economically depressed conditions forced the abandonment of the project. Production steadily declined from this point until the lease ownership changed hands in early 1932. Nineteen of the smaller wells were abandoned, and the remaining 21 cleaned out and reconditioned throughout the next two years, and as a result the production again started an increase until it reached an average of about 110 bbls. daily at the beginning of 1936. At this point a systematic program of repressuring, in addition to the application of vacuum, was started. It will be seen that the producing rate has steadily increased during the past two years, and its present daily average of about 160 bbls. has restored the 1929 level. Without the Sunday shutdowns the rate would be slightly higher.

Before repressuring was started, the wells immediately surrounding the key wells were being pumped with approximately 24 points of vacuum on the casingheads. The vacuum on these wells has been reduced to 10-15 points over a period of two years. In working off this vacuum it was noted that the wells were very sensitive to any variations in the amount of vacuum being pulled. Any slight changes affected their pumping, and it was necessary to place an orifice flange in each well and control the quantity of gas produced to get the maximum production.

On some leases offsetting this property as much as 25 points vacuum is being pulled. It therefore was necessary to select the first key well near the center of the tract. It started taking about 10,000 cubic feet daily at 14 points vacuum, directly out of a 2-pound residue line. Another key well has been added, and each is taking about 20,000 cubic feet daily at about 4 points vacuum. Vacuum has been maintained on the property from a major company vacuum line system leading to its gasoline plant.

Water Control

Figure 5 well illustrates the beneficial effect of repressuring upon water encroachment when applied at the proper points. Offsetting this particular well, another Gunsite-sand well was drilled on what proved to be a flank location. It produced a small quantity of oil and considerable water initially. The encroaching water was threatening other producers nearby. The low well was converted into a key well, and the accompanying chart shows the effect of the injection gas upon its offset. This producer had an initial production of about 140 bbls. daily, but accompanying a rapid rise in water production, it declined to the point where water and oil production was equalized. Initial injection volumes of about 15,000 cubic feet were begun about this time. An increase in the water production at offset locations was noted at first, but this was only temporary, and as soon as the injection volumes had sufficient time to stabilize fluid movement in the reservoir, the water declined rapidly with an accompanying increase in oil. It will be seen that both the oil and water production is very sensitive to variations in injection volumes, but by close check and study of reservoir performance, it has been possible to effect a 14-bbl. increase in oil production and a 100 per cent decrease in water production.

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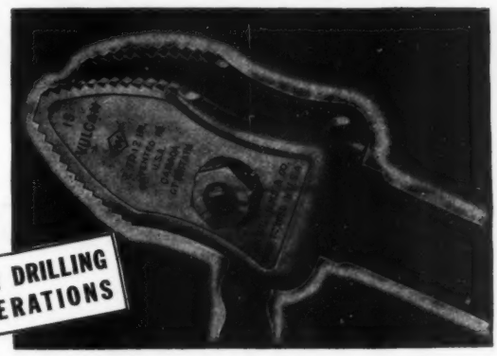

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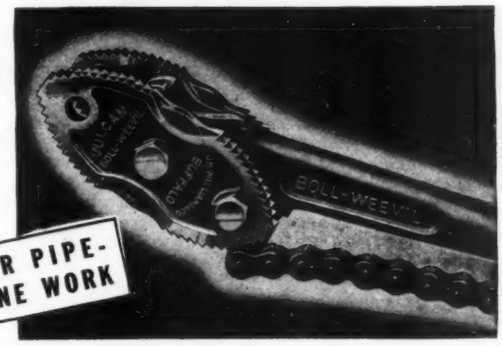

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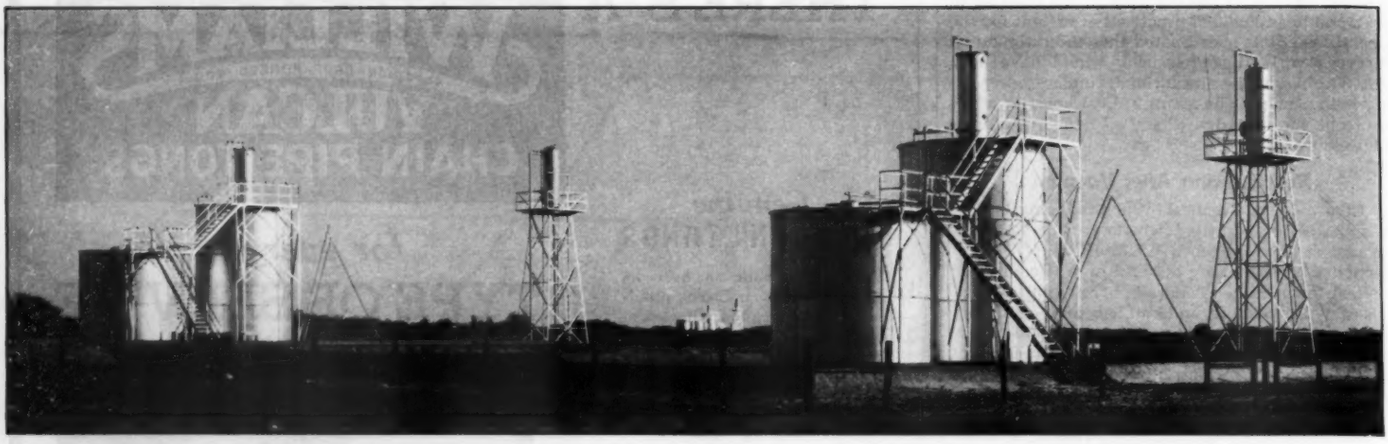


Tank battery and elevated separator installations in Flour Bluff field, Nueces County, Texas Gulf Coast

Four Hundred Wildcat Wells Drilling Throughout State

By F. L. SINGLETON and MITCHELL TUCKER

While wildcatting activity in the Gulf Coast and Southwest Texas districts in the earlier part of the year failed to show any substantial increase over the same period last year, there has been within recent weeks a gradual gain in this phase of development, and a general increase is anticipated in these two districts during the remainder of the year. At the present time, 18 wildcat operations are listed for the Upper Gulf Coast territory, 7 less than listed at the same time last year. In the Southwest district 73 active operations are listed, an increase of 12.

Wildcatting in these two districts during the first three months, however, has been highly successful. In all 14 fields have been found and while most of them are in their early development, four can be classified as of major importance. Of the total eight fields were found in the Southwest district and six are in the Upper Gulf Coast.

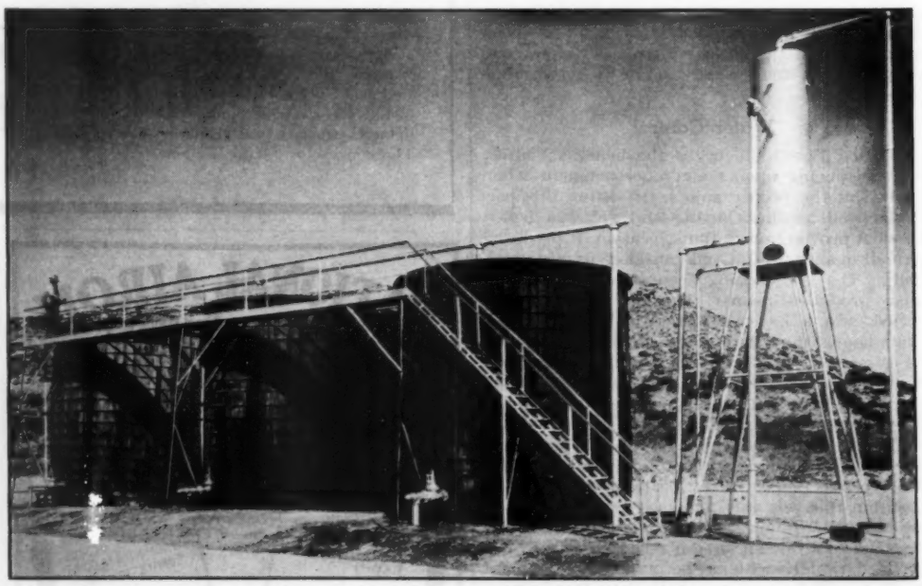
Southwest Texas

In the Southwest, new discoveries include: East White Point, San Patricio County; North Normanna, Bee County; Alfred, Jim Wells County; West Saxet, Nueces County; Nessly, a gas field in Webb County; MacDona, Bexar County; North Agua Dulce, Nueces County; and Weslaco, Hidalgo County.

In the Upper Gulf Coast, new reserves were added at North Cheek, Jefferson County; McCrosky, Matagorda County; Edna, Jackson County; Fairbanks, Harris County; and the Cedar Point field in Galveston Bay, offshore from Chambers County. Fields looked upon as important reserves are: East White Point, West Saxet, Fairbanks and Cedar Point.

The exporation in the two districts has been marked mainly by the opening of new types of structures encouraging continued effort sometimes affecting thousands of acres originally thought condemned, or believed confined to one particular type of production. While this holds true generally to both districts, it applies particularly to the Upper Gulf Coast. A brief resume of development in this district will clearly outline how wildcatting has been affected by the succession of new developments.

With the opening of Spindletop in 1901 shallow production was found in the caprock overlying the piercement type of salt dome structure. Development around the flanks of the dome led to the opening of the Miocene sand, and in 1925 discovery of the first Oligocene production resulted in deeper drilling around the flanks of all known salt dome structures. Geophysical work in 1924 resulted in the discovery of another type of salt dome structure, the shallow non-piercement type such as Orchard and Nash in Fort Bend County. In 1928 while shooting for these shallow domes, irregular conditions, which at that time could not be accurately interpreted, led to the drilling of Sugarland which opened the first Marginulina production from a nonpiercement type of structure. This revived exploration throughout the district and ultimately led to discovery of still deeper production from the Mar-



Redwood tanks are widely used for lease storage in many West Texas fields where sulfur oil is produced. This view is in the McCamey field of Upton County. Note that the gauger on the tank is wearing a gas mask as a precaution against the sulfur gas. This is a safety rule of the company

ginulina and Frio formations. The opening of Hockley production at the Raccoon Bend field along the Jackson shore line trend, resulted in the discovery of Conroe which started a trend play in search of Cockfield production.

While wildcatting in the Upper Gulf Coast during the past few years has been confined largely to development of Marginulina and Frio production, exploration within the past 16 months has been given a wide scope by the discovery of the first important Cook Mountain production along the Conroe Trend in Tyler County, and the opening of the first oil field in Galveston Bay.

As a result of the Spurger discovery the entire Conroe Trend was thrown open again for exploration which affected approximately 13 counties, including all or parts of Colorado, Austin, Washington, Waller, Harris, Montgomery, San Jacinto, Polk, Tyler, Jasper, Liberty, Hardin and several others. This area has had a widespread leasing and geophysical campaign as practically all previous development has been in search of the Cockfield production. As a result, favorable prospects formerly thought condemned are now considered as having an excellent chance to produce. This has affected not only old prospects, but has resulted in deeper drilling in the Segno field, Polk County and the Cleveland field in Liberty County. The lead in this particular phase of development has been taken by Gulf Oil Corp. which has already established production in the Upper Saline Bayou formation at the Segno field, and now has two tests in the Segno and Cleveland fields drilling several thousand feet below the regular Cockfield and Upper Saline Bayou pay.

Wildcatting has also been stimulated by the increasing number of fields producing from the Upper Saline Bayou formation under the Cockfield. This comparatively new formation has acquired significance through discovery of the Hardin field in Liberty County and the Fairbanks field in Harris County. By this development, the potentialities of the Conroe Trend have been greatly enlarged and no favorable prospects along this trend will be considered condemned without deeper drilling.

The potentialities of the district were also enlarged by completion of Salt Dome Oil Co. and Standard Oil Co. of Texas No. 1 State in Galveston Bay. The entire coast line, extending from Jefferson County on the east, and including inland bays, marshes and 3 miles into the Gulf of Mexico as far southwest as Cameron County in the Rio Grande Valley, has been affected and a large drilling program is getting under way.

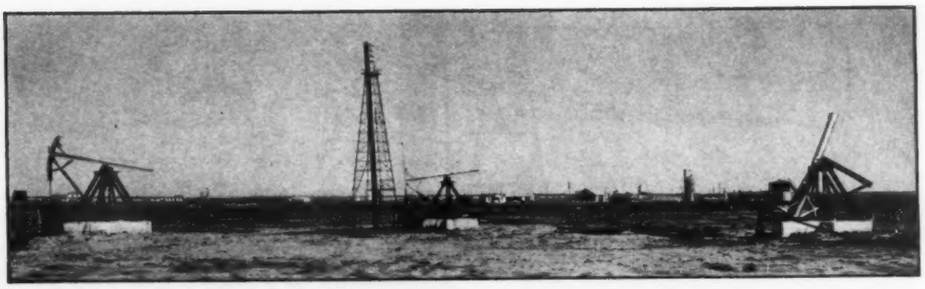
Actual drilling has been started by Humble Oil & Refining Co. on No. 1 State, about a mile offshore from Jefferson County while 9 other locations have been made and preliminary work on several, consisting of dredging and driving piling foundations has been started. Practically all acreage along the coast line has been leased by major or independent companies, and much geophysical work continues. This type of wildcatting is expected to be the feature development in the Gulf Coast area for the next few years.

A list of present wildcat operations along the Gulf Coast compiled on March 23 follows. This table does not include several outpost wells or projected deep tests which are more or less wildcat operations.

County—	No. active operations
Brazoria	1
Burleson	1
Chambers	1
Fort Bend	2
Galveston	1
Harris	4
Jackson	1
Jasper	1
Gulf of Mexico	2
Matagorda	4
Wharton	1
Total	19

The opening of the first important Cockfield production in Duval County of the Laredo area and the development of the first Frio production in Jim Wells County along the Jackson Trend has resulted in an extensive wildcattting campaign in Southwest Texas.

A concentrated campaign is now under way along a trend extending northeast-southwest from the Benavides field, the discovery of which opened deeper drilling in the Laredo area. Prior to this discovery practically all wildcatting was con-



Field scene in the Hawley field of Jones County, Central Texas, where six separate producing sands are now yielding commercial oil. This scene shows one location where four wells have been drilled, each to a different pay level. The Tannehill sand at 1,950 feet, Bluff Creek at 2,000 feet, Cook at 2,060 feet, Upper Hope at 2,150 feet, Lower Hope at 2,200 feet, and King sand at 2,350 feet are all productive in some parts of the Hawley field

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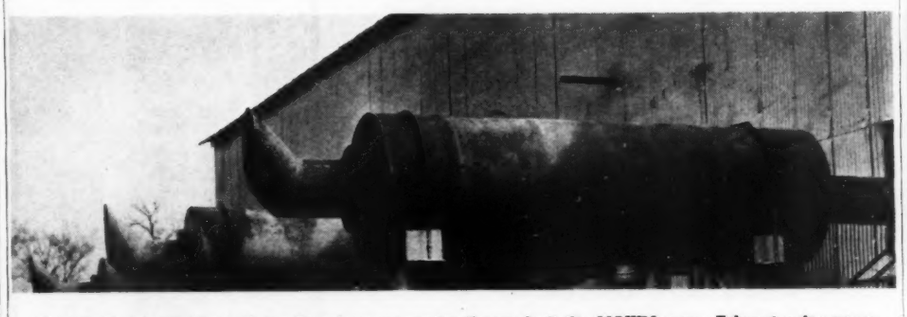

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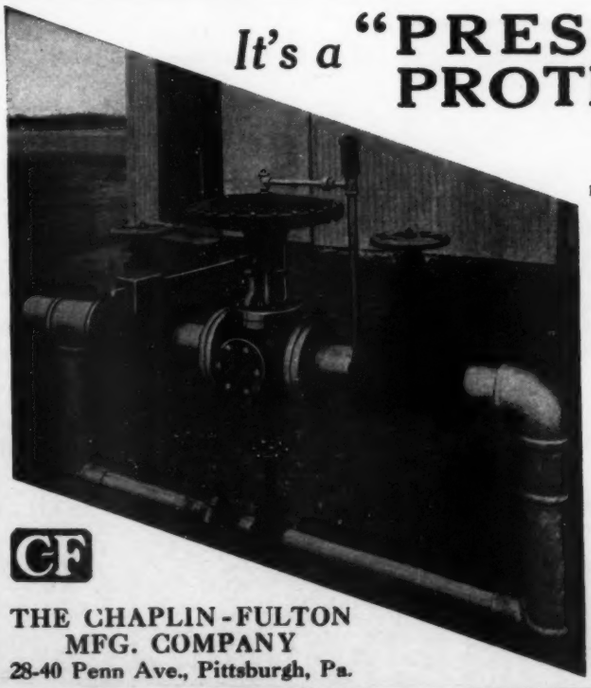

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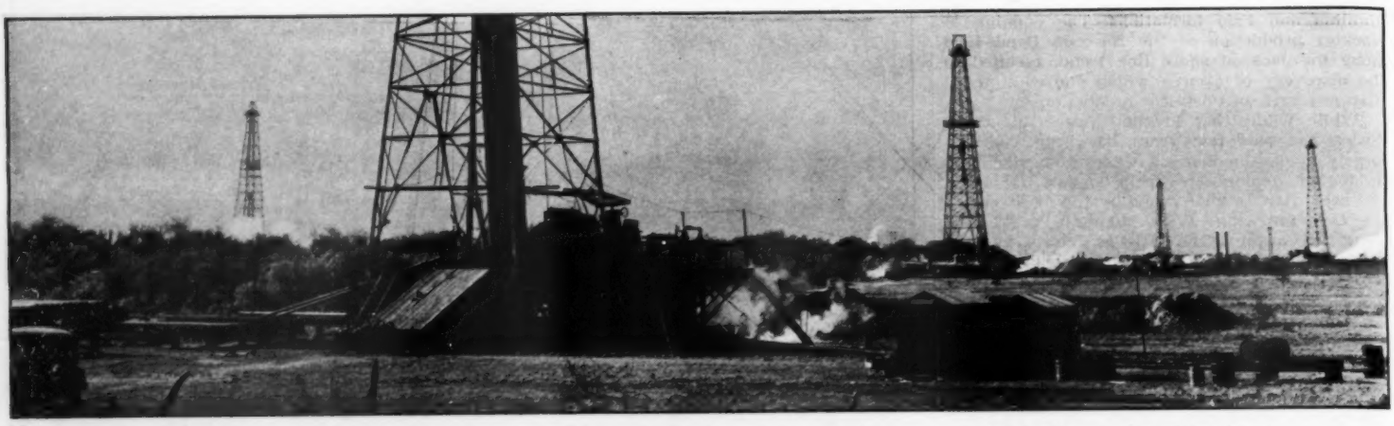

Turkey Creek field, Nueces County, Lower Texas Gulf Coast, one of the most active fields on the Gulf Coast

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fined to the development of shallow sands. Major and independent companies are working this area extensively with geophysical instruments and several prospects have been found, particularly in the vicinity of the old Palangana and Piedra Pintas salt domes, north of Benavides. Several deep holes have been drilled and there are nine active operations.

Another development expected to result in a revival of wildcatting around the edges of proven shallow fields along the old shore line trend, was the discovery of a new sand in the old Mirando Valley field, Zapata County. The well is due east of production and was drilled by Burt Calvin on the Lopez lease. The sand is believed to be the Pettus and was topped at 1,873 feet and cored to a total depth of 1,881 feet, where it was completed on the pump for an initial production of 150 bbls. per day. Mirando Valley is the oldest field in the Laredo district and an active drilling campaign is under way. Drilling for this type of production is expected to be centered in the adjoining counties of Jim Hogg, Webb and Duval.

The exploration along the Jackson Trend has been confined largely to Jim Wells, McMullen and Live Oak counties. The opening of Frio production with discovery of the East Premont field, by Magnolia Petroleum Co. has encouraged deeper drilling and other structures are expected to be developed. An incentive for a broader wildcatting campaign along this trend was the discovery of the Ezzell field in McMullen County, the outstanding shallow discovery opened in this area. Prior to this discovery, it was assumed this area was too far north to be situated on the so-called Jackson Trend but several thousand additional acres have been opened for development.

Lower Rio Grande

While wildcatting in the Lower Rio Grande Valley has been spasmodic and rather discouraging, this area is considered as being one of the largest undeveloped potential reserves in the district. It embraces Kleberg, Kennedy, Willacy, Cameron, Hidalgo, and Brooks counties where a leasing and geophysical campaign has been under way for 16 months. Practically all acreage is blocked or checkerboarded by major or independent companies and several deep holes are expected to be drilled during the year. The most interesting test now drilling is Magnolia Petroleum Co. No. 1 Armendaiz, in Willacy County, which is bottomed at 9,634 feet and casing has been cemented preparatory to carrying the hole to 12,000 feet.

With two important discoveries already recorded in the Corpus Christi district no let up in drilling is anticipated in this area comprising six continues, including Nueces, San Patricio, Aransas, Refugio, Calhoun and Victoria. Practically all these fields are composed of multiple sands and a large share of the wildcatting will be confined to the development of deeper sands in such fields as Luby, South Clara Driscoll, Agua Dulce and others.

Although wildcatting along the Balcones Fault line during the past two years has failed to open any outstanding field, this district continues to receive its share of wildcat operations. Interest is centered in the wildcatting along a large anticline extending northwest-southeast through Maverick and Dimmitt counties. Encouraging showings have

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been logged in the Buda lime by two wells scheduled to be drilled to the Edwards lime or deeper. With the disappointment of Chalk production, practically all wells are being drilled to the Edwards lime, though it has been estimated there is little hope for any sizeable Edwards lime fields and those found will be confined to a small area. Present wildcat operations are evenly divided among Atascosa, Bastrop, Bexar, Caldwell, Dimmit, Guadalupe, Medina, Miran and Williamson counties which are expected to continue the major share of wildcatting.

Active wildcats shown in the following table:

County—	Number of operations
Atascosa	2
Bastrop	3
Bexar	4
Bee	1
Caldwell	3
Dimmit	2
Duval	9
Edwards	1
Guadalupe	3
Hidalgo	2
Jim Wells	4
Kerr	1
McMullen	1
Medina	2
Milam	2
Live Oak	8
Starr	4
Webb	3
Zapata	1
Kleberg	1
Nueces	2
Refugio	1
San Patricio	1
Victoria	2
Williamson	1
Willacy	2
Goliad	1
Total	67

West Texas

There are 131 wells rigging up or drilling in the West Texas district which are properly classified as wildcats. This vast territory comprises about 60,000 square miles, or approximately 38,500,000 acres. It is interesting to note that only 1,320 dry holes have been drilled at exploratory locations outside of producing fields in this 38,500,000-acre region which extends into 26 counties. Hence, even after 15 years of wildcatting in West Texas, there still remains much favorable territory for exploration, as there has been only one dry hole drilled to each 20,000 acres.

At the present time West Texas wildcatting is being watched particularly close on two fronts, first, Permian lime tests in the northern portion of the basin, and second, deep exploratory holes to the Lower Ordovician formations.

Eight new fields have been discovered in the North Permian Basin territory during the past two years, most of which have been located by the aid of geophysics. Some appear to be in the eastern platform trend of fields, and its northern extent is not yet determined. Many geophysically mapped structures in this region remain to be tested. Wildcatting is also active in an effort to establish producing limits of such newer fields as Bennett, Wasson, Harper, Foster, Slaughter, Seminole and others.

Nineteen exploratory wells are now being drilled in West Texas, having production in the Ordovician as their objective. This horizon is productive at Big Lake and Sand Hills, and has afforded impressive shows in several of the 30 dry holes that have been abandoned at this deep level. Eventually all present Permian structures, and much of the intermediate acreage, will receive Ordovician tests. The search has been going on for nine years, and will probably continue at this slow constant rate unless stimulated by the discovery of new fields.

The drilling of "thin" or exploratory holes by heavy duty core drilling machines has been pioneered in West Texas, and will probably be continued in some areas by those companies who employ this practice.

West Central Texas

As in the western part of the state, much of the present wildcatting in West Central Texas is projected to the Ordovician. First production in this horizon was found by a few widely scattered wells during the Ranger boom in 1920, but the present stimulation to the campaign was given by the recent discovery of Ellenburger (Lower Ordovician) fields at Oplin and Cisco Lake. There are

(Continued on Pages 182, 183 and 184)

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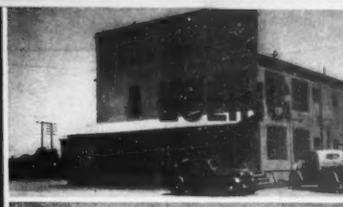

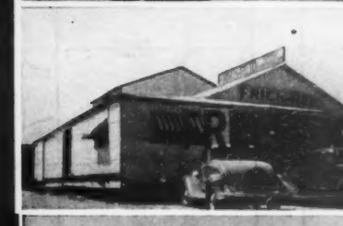

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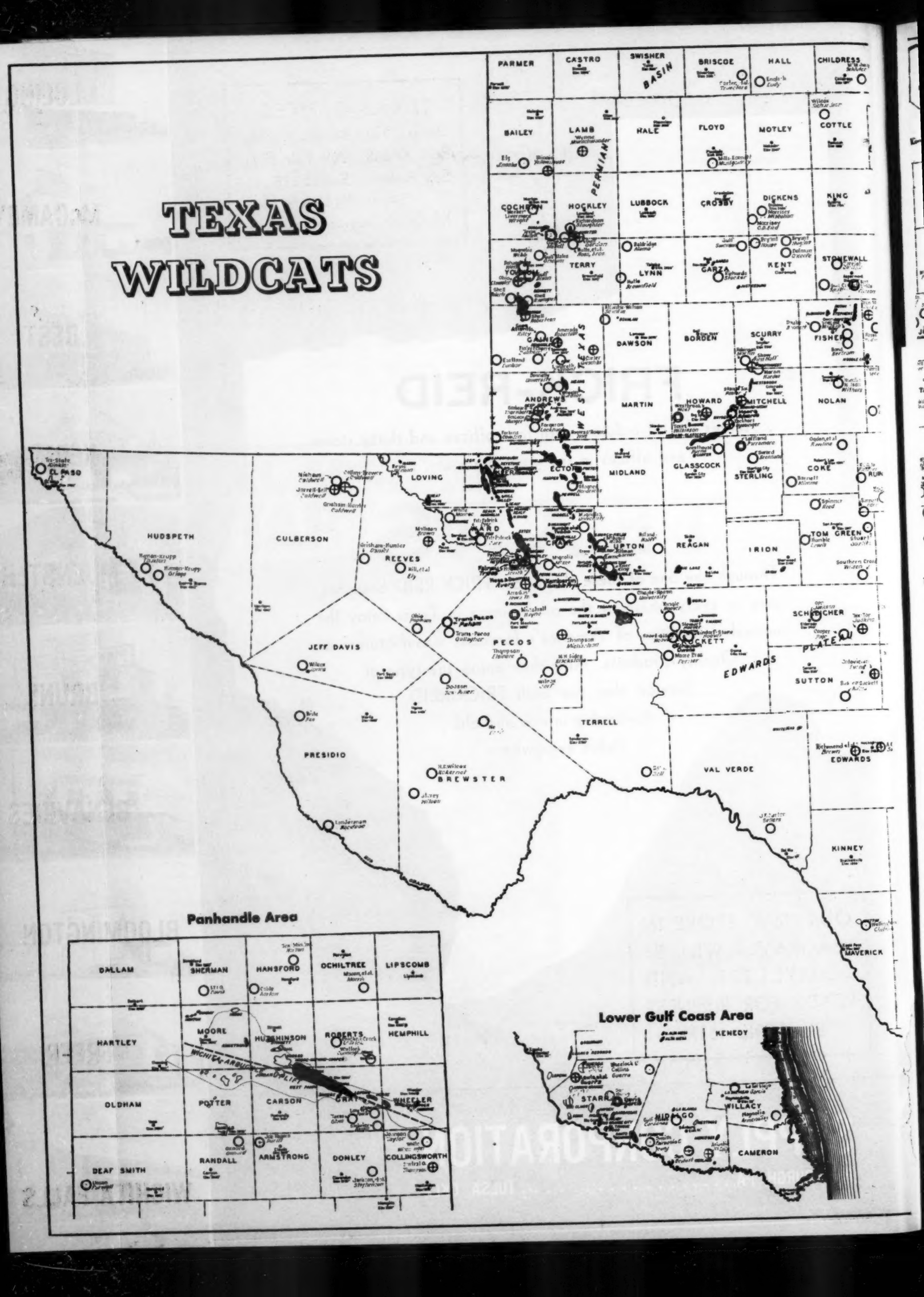
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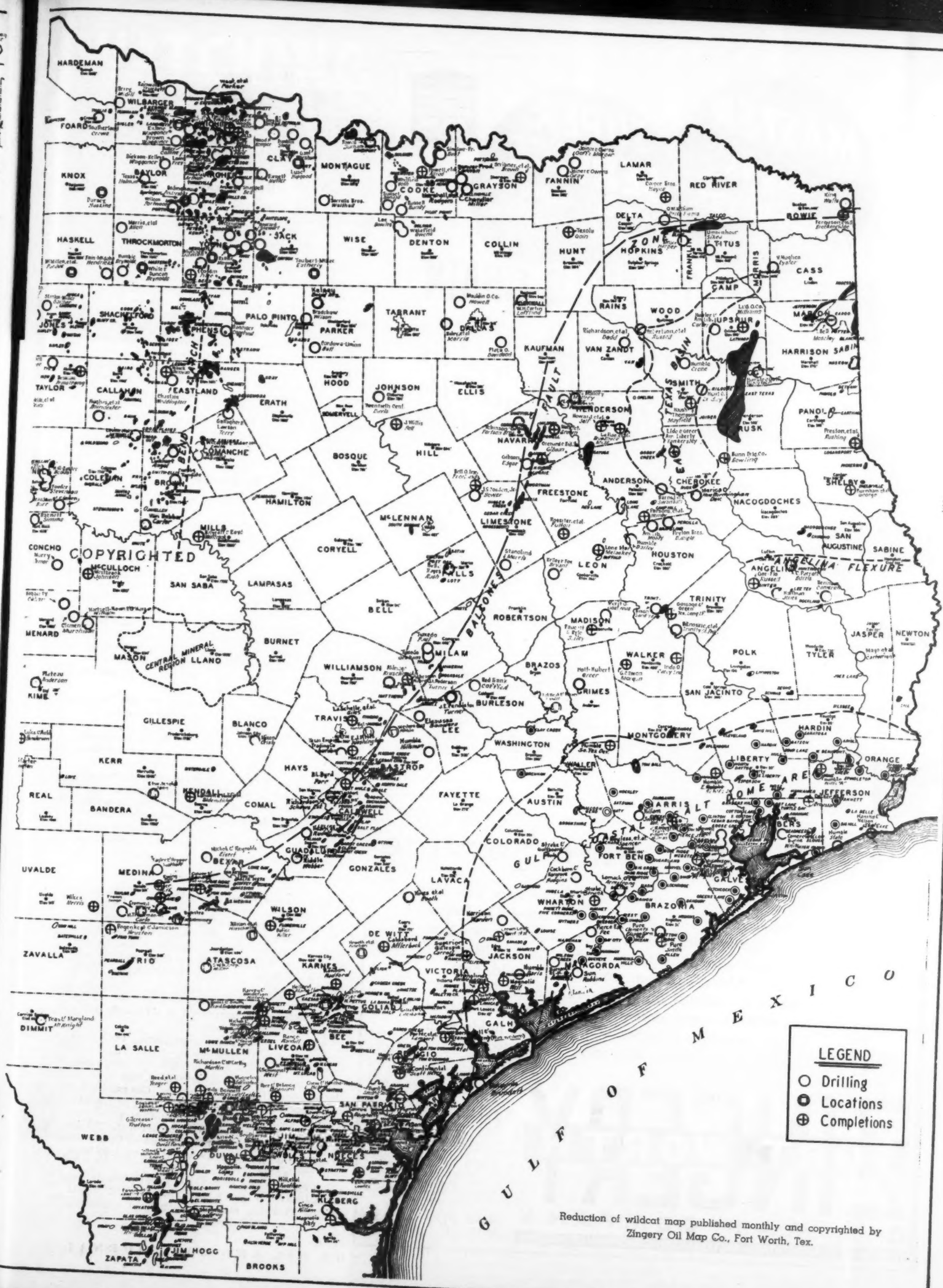

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now 69 wells classed as wildcats in this portion of Texas, of which 18 have announced intention to test the Ordovician.

Most of the remaining tests in this district will seek production in the Ranger lime or its equivalent, or one of the other producing zones of the Pennsylvanian, along one of the several well established northeast-southwest trends across the Bend arch.

North Texas

While some wildcatters in the North Texas district are still attempting to define the productive limits of the deep K.M.A. field, many others are turning their attention to the active search for K.M.A. lime production in other parts of the district. Following the recent 5,000-bbl. gusher completed in this horizon in northern Archer County about 9 miles southeast of K.M.A., this county has come to be considered a very likely location for new deep oil pools, and at this time nine deep tests are rigging up or drilling. Wilbarger and Clay counties are also sharing in this activity. This part of the state will remain an active wildcatting territory until all likely locations are explored by wells to the K.M.A. limestone at the base of the Strawn series. The seismograph has become a popular method of mapping structures on this line, and several crews are now busy in the area. Two structures with good closure have been mapped just west of Wichita Falls, and tests are planned there soon.

Panhandle

Panhandle wildcatting has not been very active during the past two years, following unfavorable results from the several deep holes drilled in 1935-36. Phillips Petroleum Co. drilled the deepest well in that district to date, situated on the northern flank of the Amarillo uplift in Wheeler County Its No. 1 Porter explored below 7,400 feet with cable tools, and logged over 4,000 feet of granite wash with some showings. The hole was finally abandoned as nonproductive, but has stimulated the continued search in some localities. There are now 16 drilling wells in the Panhandle classed as wildcats, three each in Gray and Collingworth counties, two in Hansford County, and one each in Sherman, Ochiltree, Roberts, Donley, Randall, Deaf Smith, Childress and Hall counties.

Indian Territory Illuminating Oil Co. No. 1 Davis in Sherman County is now heading the list of promising Panhandle tests, as it has opened a new sweet gas producing area about 15 miles north of the field proper, but continues to explore below 3,200 feet in search of oil bearing formations. Situated as it is, between the Panhandle production in Moore County, and the gas production in Texas County, Oklahoma, this test has served to create a very active leasing campaign throughout the intermediate area. All acreage is being placed under lease, and further wildcatting across Sherman County may be expected in the near future.

East Texas

East Texas wildcatting has been on the decrease for the past year, largely because of the consistently unfavorable results in both Woodbine and Trinity tests. Important exploration in the East Texas Basin, and along the border counties, is now divided between the shallow Woodbine tests, and the few very deep holes to the Travis Peak or Lower Marine Trinity.

Woodbine tests are in search of other pools along the Balcones Fault trend, or at possible points on the east side of the basin.

To date 24 important deep Trinity tests have been drilled in 12 counties in eastern Texas, and although these are not sufficient to permit any great amount of detailed correlation, they are serving as a basis for future locations. Gas production has been found in the Lower Trinity at Opelika, Cayuga, and in several border counties one or two-well pools. The Lower Marine section of the Trinity is still an unknown quantity in eastern Texas, but it offers a deep possibility which future deep holes will not ignore.

Deepest of the East Texas Basin wildcats was Stanolind Oil & Gas Co. and others No. 1 T. Norris. in the Thornton faulted structure of Limestone

(Continued on Page 188)

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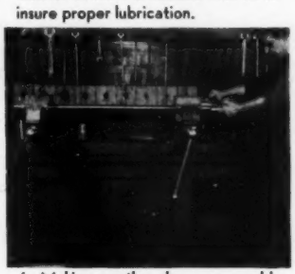
1. Here are the parts for an Axelson R. S. L. stationary barrel type pump, with top-lock hold-down, Perry Barnwell plunger, combined collar and cage, hardened cast iron liners and Axloy seats and balls.

2. The first assembly operation consists of inserting liners into pump jacket. Note that faces of liners are carefully cleaned before inserting.

3. Collars are then loosely screwed into both ends of the pump jacket. Interior of liners is flooded with oil to insure proper lubrication.

4. The mandrel is now inserted through the entire length of the pump jacket, thus bringing the liners into proper alignment.

5. While mandrel is still inserted, collars at each end of jacket are tightened. This maintains proper alignment after mandrel is withdrawn.



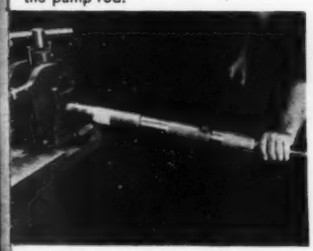
6. Making up the plunger assembly is the next step. The adapter for the pump rod is screwed tightly into the upper end of the plunger.

7. The rod guide is now assembled to the top-lock body. This assembly is then slipped over the pump rod.

8. The pump rod is then tightened into the plunger adapter, and the top-lock body is loosely slipped over the pump rod.

9. Seat and ball is now inserted into the lower end of the plunger and the Perry nut tightened against seat. This completes plunger assembly.

10. The plunger assembly, now complete, is inserted into the pump barrel, which has been properly aligned, as described in No. 4.

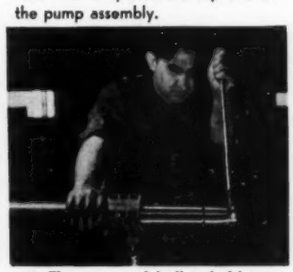


11. After inserting the plunger assembly into pump barrel, top-lock body and rod guide are tightened into top collar of pump barrel.

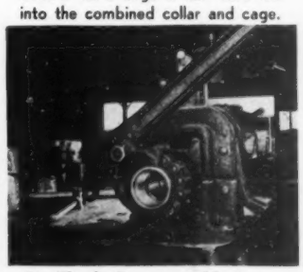
12. Next, the pump rod coupling is securely tightened onto the pump rod. This completes the top end of the pump assembly.

13. It is now necessary to complete the bottom end of the pump. The double valve cage is now screwed into the combined collar and cage.

14. The seat and ball is then inserted into the double valve cage. Seat and ball have been previously vacuum tested for perfect seating.



15. The seat and ball is held into place by the standing valve body. This standing valve body acts as a pilot when lowering pump into well.



16. The locking assembly is now made up and secured by the clamping collar. The pump is now oiled and painted, and boxed for shipment.

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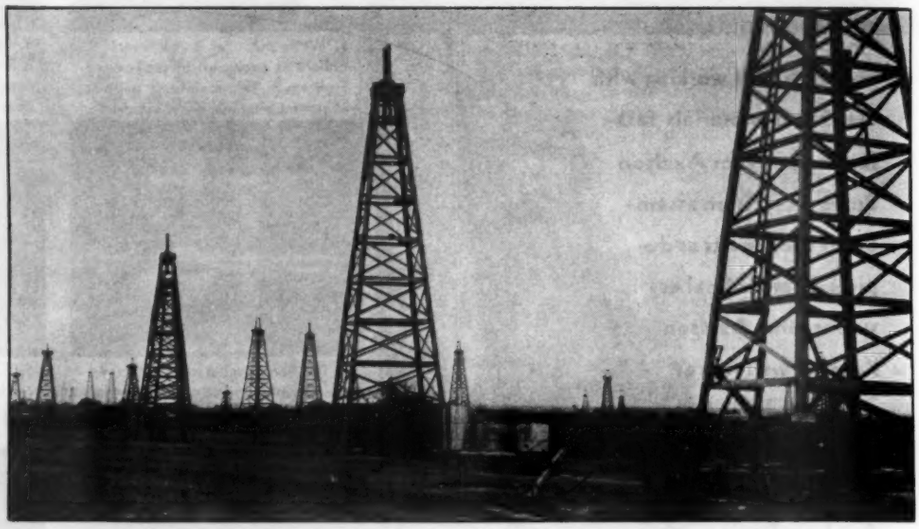
Interest Being Revived in Old Balcones Fault Line District

By F. L. SINGLETON

The opening of Edwards lime production in the Branyon field, Caldwell County, Texas, together with improvement in drilling and production methods and successful use of acidizing in a large-scale reconditioning program, has revived interest in the Balcones Fault line district. Production in several of the older Edwards lime and chalk fields which a year ago were near depletion has been materially increased. Even greater results are expected as revised methods of production become perfected.

Fields mainly affected by the newer production methods and reconditioning work include Branyon, Luling, and Salt Flats, in Caldwell County, and Darst Creek in Guadalupe County. Production from this group is found at 1,850 feet to a maximum of 2,600 feet. The cost of drilling these wells ranges from $7,500 to $8,500, which is attractive to the small operator now that he is practically assured of a return on his investment.

Activity in the Branyon field started in January, 1937, following completion of Whisenant & Trenchard No. 1 McGee, in the northeast end of the field in the John Neil Survey. Production was from a crevice in the chalk at 2,165 feet, and the well had an initial flow of 1,500 bbls. per day. This was the first crevice well completed. Previous production had been from fractured or broken sections in the chalk from which a few small wells had produced from 10 to 12 bbls. a day. Prospects of a profitable pay-out from the crevice led to a rather active drilling campaign, which in turn resulted in discovery of Edwards lime production by the Lincoln Oil Co. in the Branyon field proper.



General view of portion of Branyon field, Caldwell County, Fault line district

Two Faults

Production at Branyon is controlled by two parallel faults, referred to as the "Young-Ellison" fault and the Branyon fault, the latter located about 3,000 feet east. Small production from the chalk was developed in this area in July, 1937. Production failed to hold up and drilling activity ceased.

Production along the Branyon fault, which has a displacement of 200 feet, has been established in the chalk and Buda lime sections for about 8 miles, while production from the Edwards lime is confined to the high part of the structure, extending about 5 miles from Clear Fork Creek on tthe west to Plum Creek on the east.

The Edwards lime produces from a minus 1,880 feet to a maximum high of a minus 1,840 feet. The average initial production is from 60 to 250 bbls. of oil and some sulfur water. It is estimated that the ultimate recovery from each well will be from 25,000 to 75,000 bbls. Twenty-two wells have been completed in the Edwards and 140 are producing from the chalk.

Production from the chalk and Buda lime wells declines rapidly and in most cases they will not pay out. For this reason no chalk wells are expected to be drilled until new methods of oil recovery are perfected. Two new completion methods are being considered. One is the use of a knuckle joint to deviate the hole at a high angle by the whipstock method. It is planned to drill a straight hole to the top of the chalk and by use of the knuckle joint, drill two or three holes through the section. By doing this, the well would have proportionately more drainage and the porous section would receive the full effectiveness of the acid. The other method employs a gun perforator. The chalk section at Branyon has an average thickness of about 260 feet. The porous sections are very thin and are streaked throughout the formation. By using a Schlumberger survey to locate the porous sections and then gun-perforating and treating with acid under several thousand pounds pressure, it is believed a higher recovery of oil will be gained.

Unloading water from hole of Luling workover well after testing for cavity

Completion Methods

The present method of drilling and completing wells in this field is to drill through the entire chalk section into the top of the Buda lime. It is customary to use 6- or 5½-inch casing. This is cemented on top of the chalk formation. In some cases the wells are completed on the pump without acidizing and are allowed to pump for several days. This allows the hole to become thoroughly cleaned of cuttings and other sediment to drain from the formation. The tubing and rods then are pulled with a light tractor equipped with a winch and an acid treatment of 2,000 to 5,000 gallons is applied to the formation under a pressure of 700 pounds for about 12 hours

A typical section from the Austin chalk to the Edwards lime consists of 20 feet of Eagleford shale beneath the chalk section, 60 feet of Buda limestone, 60 feet of Del Rio clay and 55 feet of Georgetown lime. All production in the Edwards is from the top section, and it is a general practice to use 2,000 gallons of acid, applied under a pressure of 250 pounds.

The use of acid in most chalk and Edwards lime fields along the Balcones Fault line has been very successful. Although the same results may not be obtained in all fields, owing to various

structural conditions the problems in each field are being worked out by individual operators through much experimental work, and if a certain method proves successful it usually is adopted generally. These experiments are being followed closely by the operators, who are interested in increasing their recovery from the chalk wells. While this type of production is not highly regarded, owing to the rapid decline in production after acid treatment, the average combined thickness of the porous sections through the chalk ranges from 50 to 100 feet, which represents several hundred thousand barrels of oil. Under the present practices all of this oil cannot be recovered and for this reason special attention is paid to revised production methods.

The decline in production of the old Luling field, which is one of the oldest in the Southwest Texas district, has been materially increased during the past year by a large-scale reconditioning program. This work started last year after the field began to make a tremendous amount of water. While the water-drive in this field has been responsible for a high per-acre recovery, the water content in practically all wells during the past few years increased to such an extent that producing the wells became a matter of stripping a few barrels of oil from salt-water wells. In some cases several wells were producing 500 bbls. of fluid per day of which 95 per cent was water.

Old Cementing Method

Before the present methods of reconditioning were used, the wells were cemented back by merely pumping in the cement and allowing it to fill back to a depth several feet above the water section. In doing this, however, several feet of the producing horizon was cemented off, which reduced the producing section in proportion to the water.

In working over these wells by present methods, the cement is drilled out to the total depth or deeper, and the hole then is cemented back to the top of the producing section. The cementing is done by lowering the tubing to the bottom of the hole, and then pumping in the desired quantity of cement. The tubing then is raised, allowing clear water to flow into the casing in an attempt to establish complete circulation. The casinghead is closed, and the cement is driven into the formation under a pressure of 2,000 pounds. The water veins have been found to take the cement more readily than the oil stratum, consequently when the cement is drilled out, a cement wall of considerable thickness remains in the water stratum. An acid treatment ranging from 500 to 1,000 gallons usually is applied and is held under pressure for several hours. In many instances the acid would eat downward, deepening the hole, resulting in an increase of water. This difficulty has been overcome by pumping in a small quantity of cement to the bottom of the hole, just before the acid treatment.

Another successful method of reconditioning has been employed by the Grayburg Oil Co. on the Tabor lease. This lease contains 11 wells and by plugging back and gun-perforating, and then treating with acid, the company has increased its production back to a point where it was four years ago. In most cases the original production string of casing consisted of 6- or 7-inch pipe. Owing to the eroded condition of the casing caused by the salt and sulfur water, the hole is drilled out to bottom and a new string of 5-inch is cemented on bottom. The present production is developed from the Dobie lime, just above the Edwards horizon, which during the early life of the field was thought to carry salt water. While this company has been handicapped to some extent by the lack of accurate well logs, the producing section is found by the variation of well elevations and by gun-perforating. After the hole has been cemented back to the desired depth, the casing is perforated with one or two shots. The section then is tested for cavities by pumping in clear water under pressure. If the pressure shows a rapid decrease, the operator knows that the cavity is too large and that a successful completion is impossible. The perforations then are cemented off and the next shot is placed either higher or lower until the prospective horizon is reached.

Each well on this lease before being worked over was making approximately 15 bbls. of oil and several hundred barrels of water per day.

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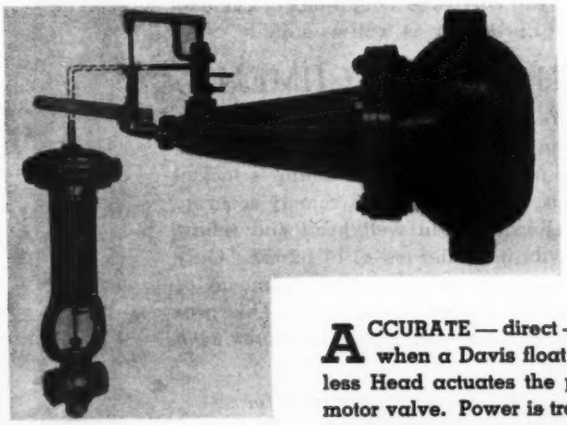

THE hook-up shown above consists of a Davis No. 162 D Packless Float Box with pilot valve actuating a Davis No. 14 diaphragm motor valve.

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After plugging back and treating with acid, the water content has been lowered, and the initial pumping gauge is from 60 to 100 bbls. per day. The well usually pumps at this rate for several days and then production declines to a steady average of 45 to 50 bbls.

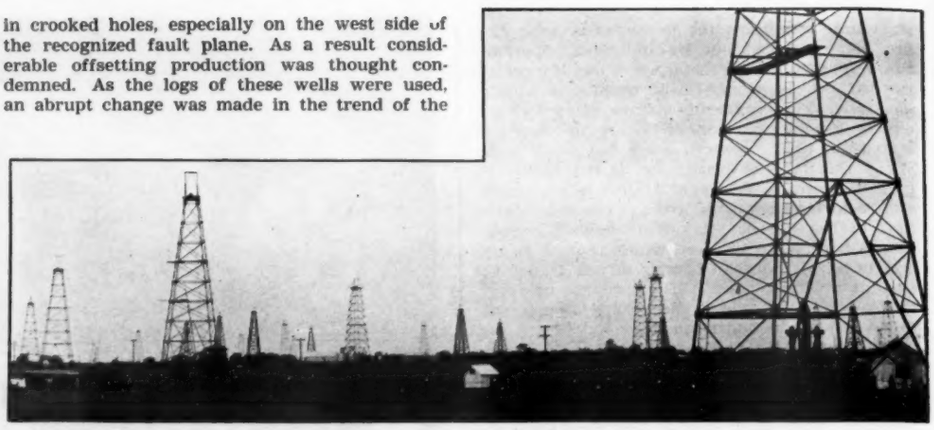
This phase of operation requires a crew of only two or three men. The tubing and rods are pulled with a light tractor equipped with a small winch, and the cement usually is drilled out with a small portable cable-tool rig.

Planned Drilling

Careful drilling, with the aid of directional drilling equipment, has added approximately 100 acres of Edwards limestone production to the Darst Creek and Salt Flat fields during the past few months.

During the early drilling campaign in these fields operators were interested chiefly in getting their wells to the pay as soon as possible in order to keep up with offset obligations. This resulted in crooked holes, especially on the west side of the recognized fault plane. As a result considerable offsetting production was thought condemned. As the logs of these wells were used, an abrupt change was made in the trend of the fault which eliminated acreage that otherwise would have been considered productive.

By making a more thorough study of the erratic conditions along the recognized faults of the two fields, it recently was found that crooked holes, rather than unusual faulting conditions, resulted in the dry holes being drilled on the west side of the producing area. Since then wells have been drilled at the point of these abrupt changes, and prolific production has been obtained. It has been found by careful drilling that when the bit encounters the fault it has a tendency to deflect and follow down the fault plane in the Taylor marl section, which is much softer at this point. By keeping a careful check on the direction of the hole and then setting directional drilling equipment at the point of the fault plane, wells now are being drilled on the west side of the fault without trouble.



General view of old Luling field, Caldwell County, Fault line district

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WILDCATS

(Continued from Page 184)

County. The Lower Trinity was drilled here from 7,595-8,525 feet, the Permian lime equivalent from 8,525-8,995 feet, salt and anhydrite from 8,995 to 9,845 feet, and conglomerate from 9,845-9,951 feet, total depth. Currently this well is plugging back and testing upper levels, pending abandonment. It has afforded much to the geological information of the district, and will be a guide to future exploratory work in the deep horizons.

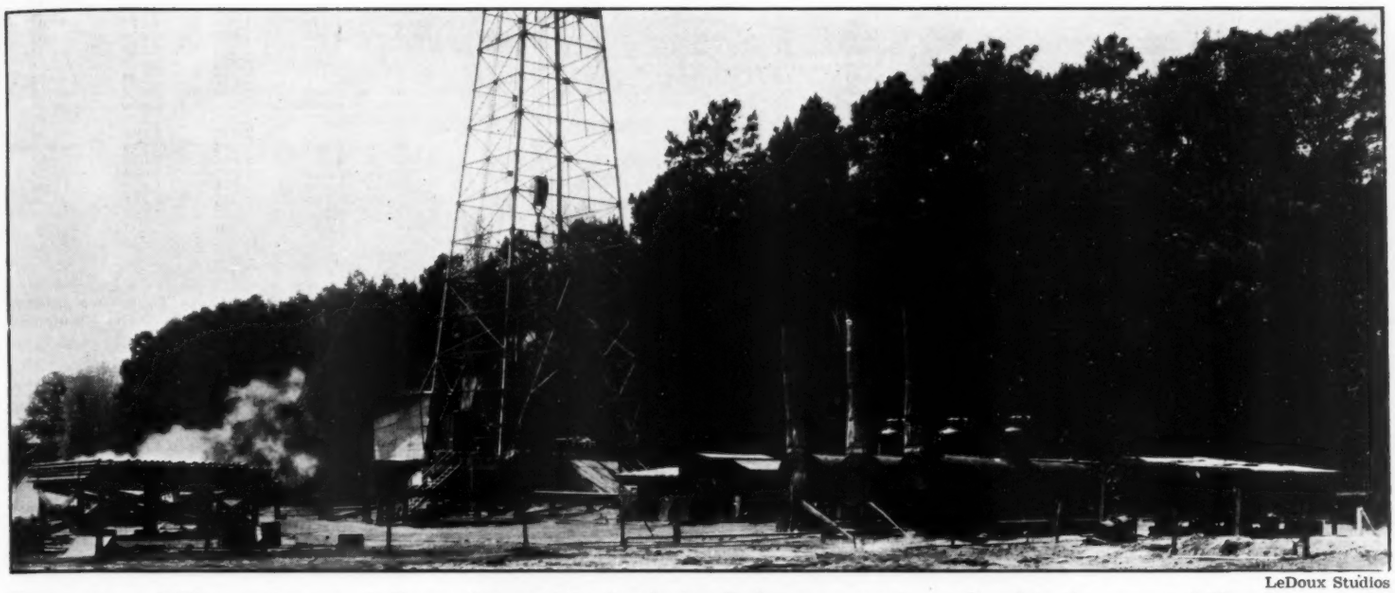
One of the most important tests being drilled at this time is Gulf-Humble No. 1 Robertson, 4 miles east of the East Texas field and situated on the west flank of the Sabine uplift. Deeper production along a possible monoclinal structure on this side of the uplift is the objective here. The well is now drilling below 9,430 feet in the Lower Marine, having logged some large gas zones in the Glen Rose and Travis Peak formations above.

The west side of the East Texas Basin is getting its first deep Trinity test, as H. L. Hunt and others No. 1 Bradley in the Chapel Hill area of Smith County near Tyler is now drilling below 2,500 feet.

East Texas Border

The Lower Marine Trinity already has become a very attractive deep objective in Harrison, Panola and Shelby counties along the East Texas border. Magnolia Petroleum Co. No. 2 E. A. Hull is the deepest well in the region, having drilled the Lower Marine from 8,075 to 8,718 feet, and logged tight gas and distillate sand from 8,686 to 8,718 feet. The well was later plugged back and completed as a gasser in the Lower Glen Rose, due to mechanical difficulties. Further exploration of the Travis Peak and the lower horizon may be expected when an outlet is provided for the gas production.

Wildcat exploration in the eastern border counties will probably be centered in Marion County, southwest of the Jefferson-Lodi portion of the Rodessa field. Showings of gas and distillate in the Hill sand, and small showings of oil in the Gloyd in a recently drilled wildcat 3½ miles southwest of Jefferson, point to possible production further down the Rodessa fault system. This trend is expected to have considerable wildcatting in the near future.



LeDoux Studios

Heavy steam drilling equipment, similar to that used in developing Rodessa proper, is employed in the current drilling boom in the Jefferson-Lodi district

New Jefferson-Lodi District Fast Becoming Center of Activity

By GEORGE WEBER

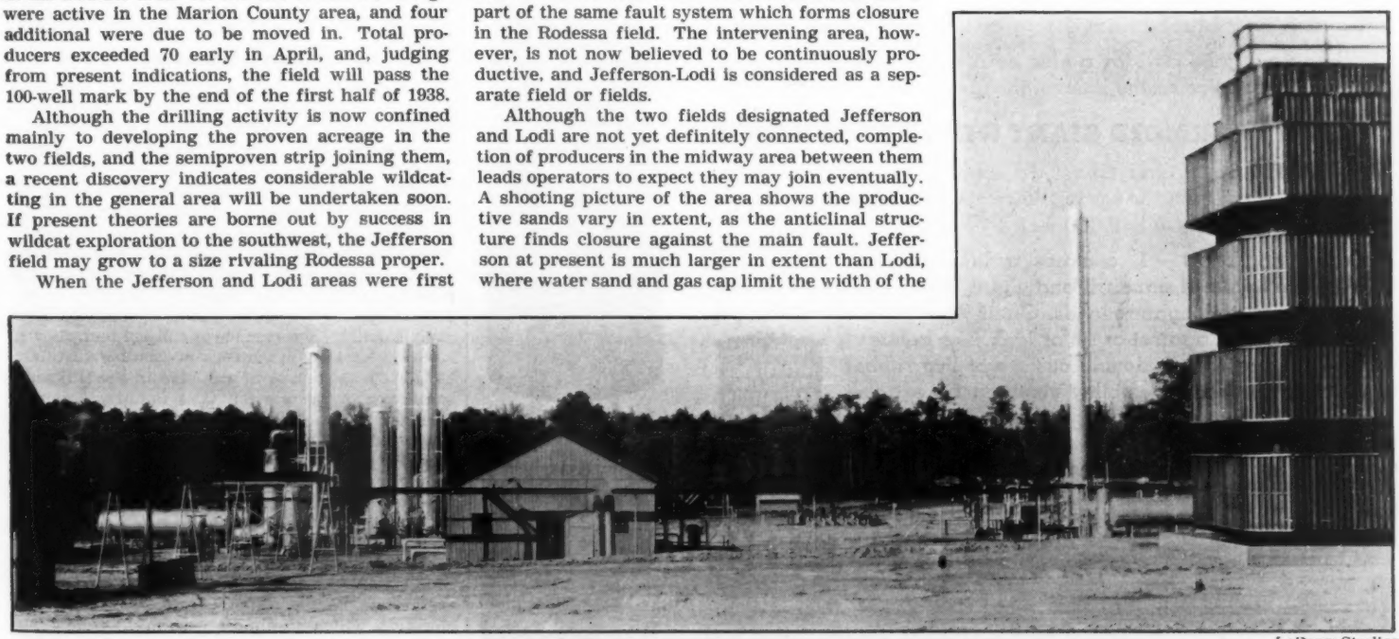
The Jefferson-Lodi district of the Rodessa field, now a little over a year old, is fast becoming the center of greatest drilling activity in the tri-state area. At the end of March, 22 rigs were active in the Marion County area, and four additional were due to be moved in. Total producers exceeded 70 early in April, and, judging from present indications, the field will pass the 100-well mark by the end of the first half of 1938.

Although the drilling activity is now confined mainly to developing the proven acreage in the two fields, and the semiproven strip joining them, a recent discovery indicates considerable wildcatting in the general area will be undertaken soon. If present theories are borne out by success in wildcat exploration to the southwest, the Jefferson field may grow to a size rivaling Rodessa proper.

When the Jefferson and Lodi areas were first opened to production last year, they were considered as extensions to Rodessa. The production lies about 13 miles southwest of the Cass County end of the tri-state field. The newer fields are a part of the same fault system which forms closure in the Rodessa field. The intervening area, however, is not now believed to be continuously productive, and Jefferson-Lodi is considered as a separate field or fields.

Although the two fields designated Jefferson and Lodi are not yet definitely connected, completion of producers in the midway area between them leads operators to expect they may join eventually. A shooting picture of the area shows the productive sands vary in extent, as the anticlinal structure finds closure against the main fault. Jefferson at present is much larger in extent than Lodi, where water sand and gas cap limit the width of the field to less than a mile at one point. The productive area between seems to narrow even more.

The typical closure found in the fields is against



LeDoux Studios

The Arkansas Fuel Oil Co.'s gasoline plant at Jefferson is capable of processing 43,000,000 feet per day. Approximately 90 per cent of the field's gas production is gathered in this plant system

BOTTOM-HOLE PRESSURES—RODESSA FIELD, MARION COUNTY, TEXAS—HENDERSON SAND

(Railroad Commission of Texas, Engineering Department, Kilgore, Tex., March 25, 1938)

Operator:	Lease:	No. well.	Elev.	P.D.	No. bomb	Date	T.P.	C.P.	Obs.	Corr.	—5,750	3-20-38	Change per day
Arkansas-La. Gas Co.	Ford, E.	2	348	5,980	38	3-22-38	1,875	....	2,633	2,584	2,622	2,626	—1.90
Arkansas-La. Gas Co.	Ford, W. S.	1	331	6,000	38	3-22-38	800	....	1,285	1,242	1,268	1,272	—2.07
Arkansas-La. Gas Co.	Houston, A.	1	292	6,040	38	3-22-38	1,600	2,200	2,650	2,601	2,602	2,603	—1.62
Arkansas-La. Gas Co.	Houston, W.	1	323	5,980	38	3-22-38	825	1,000	2,554	2,505	2,535	2,532	+1.45
		2	289	6,000	38	3-22-38	850	900	2,582	2,534	2,546	2,542	—2.11
Arkansas-La. Gas Co.	Neilon	1	200	5,950	49	3-22-38	1,525	1,525	2,254	2,212	2,212	2,230	—0.24
Barham, Eleanor	Whitfield	1	298	6,048	49	3-24-38	1,610	2,000	2,739	2,688	2,688	2,692	—1.10
Barham, George E.	Brantley	1	278	6,028	38	3-23-38	1,300	1,600	2,745	2,694	2,694	2,696	—0.66
Fohs Oil Co.	McReynolds, "A"	3	351	5,981	38	3-22-38	1,450	1,500	2,218	2,177	2,215	2,219	—2.17
Heyser, Heard & Ciardy	Henderson "A"	1	242	5,992	49	3-23-38			2,708	2,658	2,658	2,661	—1.04
Holcomb & Thompson	Henderson "A"	1	270	6,000	49	3-24-38	1,035	2,175	2,690	2,640	2,646	2,646	New well
Holcomb & Thompson	Henderson "B"	1	248	5,998	49	3-23-38	1,125	1,900	2,665	2,616	2,616	2,624	—2.67
Shell Petroleum Corp.	Cooke	1	289	6,000	38	3-23-38	1,200	2,050	2,705	2,655	2,667	2,668	—0.34
Hunter Co., The	Fonda	1	305	6,025	49	3-22-38	875		1,808	1,774	1,784	1,812	—13.79
Turner & Mullins	Scuddy	1	236	5,910	49	3-22-38	1,275	1,550	2,753	2,702	2,726	2,724	+0.56
Union Prod. Co.	Hutchinson	1	274	6,024	49	3-22-38	825	975	2,674	2,625	2,625	2,628	—1.61
		2	307	6,040	49	3-22-38	1,100	1,700	2,674	2,625	2,630	2,633	—1.41

Average 17 wells—2,459.29 lbs./sq. in.

a major fault which has its upthrow on the north and its downthrow on the south. The fault extends in a general northeast-southwest direction. Angle of dip of the fault plane is 43 to 45 degrees southeast.

Production to date is from two sections in the Lower Glen Rose formation. These are termed the Henderson and Gloyd sands, or the Upper and Lower Gloyd, and correspond to the Gloyd sections which produce in Rodessa to the northeast. Characteristics of the crude produced in the two separate areas, however, differ somewhat, leading operators to suspect from the first that the two areas were located on separate and unconnected reservoirs of the same fault system.

Development of the Jefferson and Lodi areas has proceeded along similar lines during the past year. The first commercial production was completed at about the same time. In early February, 1937, Holcomb & Thomason and Flesh & Hootkins cored saturated Gloyd sections in the wildcat, No. 1 Lizzie Henderson. The well, in the Bennington Survey due north of Jefferson, topped the massive anhydrite at 5,488 feet and the Hill sand at 5,860 feet. Saturated porous sections in the Gloyd sand were encountered at 5,935-49 and 5,955-6,032 feet. The well was carried to a total depth of 6,405 feet and later plugged back to the pay. The casing was perforated at 5,982-96 feet, and, after several weeks of production tests, the well was placed on commercial production in April.

At the same time, a second wildcat, several miles to the northeast of the Jefferson discovery, and midway between it and the Rodessa field, was also completed for a producer and discovery well. Located in the Charles Grayson Survey, in what is termed the Lodi area, Arkansas-Louisiana Gas Co. No. 1 Ford was completed in April as the first producer in that field. Like the Jefferson well it produces from the Gloyd formation.

Development of both areas proceeded following the discoveries, but extension was more rapid in the Jefferson pool. The most important discovery in the area since the two original strikes, occurred late last year, when H. B. Turner No. 1 Scuddy, a wildcat midway between Jefferson and Lodi was brought in as a producer, for the first time indicating the joining of the two fields by continuous production.

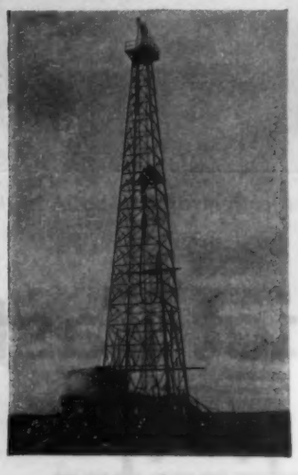
Recent Discovery

Developments of the past few weeks, however, tend to surpass in importance any discoveries since the fields were brought in. The center of attention for operators interested in Marion County is now the area southwest of the Jefferson pool.

Late in March, Arkansas-Louisiana Gas Co. No. 1 Pitts, in the Charles Lockhart Survey, 3½ miles southwest of the present edge of production in Jefferson, obtained shows in the Hill and Gloyd sections. Anhydrite was topped at 5,266 feet, and the massive anhydrite was topped at 5,533 feet. In the Hill sand, which produces gas in the main Rodessa field, a drill stem test made at 5,918-21 feet, showed recovery of large quantities of gas and distillate. This is the first show of any kind in the Hill sand, southwest of the eastern Cass County border in Rodessa proper. The wildcat was deepened to the Gloyd section, and on a drill stem test at that level 30 feet of oil, 120 feet of mud and 60 feet of brackish water was recovered using one-quarter inch chokes top and bottom.

The show in the Hill sand is considered by geologists of the area to indicate the presence of oil production down structure from the outpost well. Possible extent of this reservoir is, of course, for the present a matter of conjecture, but the further exploration which is almost certain to follow immediately will be of utmost importance in defining it.

In Jefferson, the water tables and gas cap in



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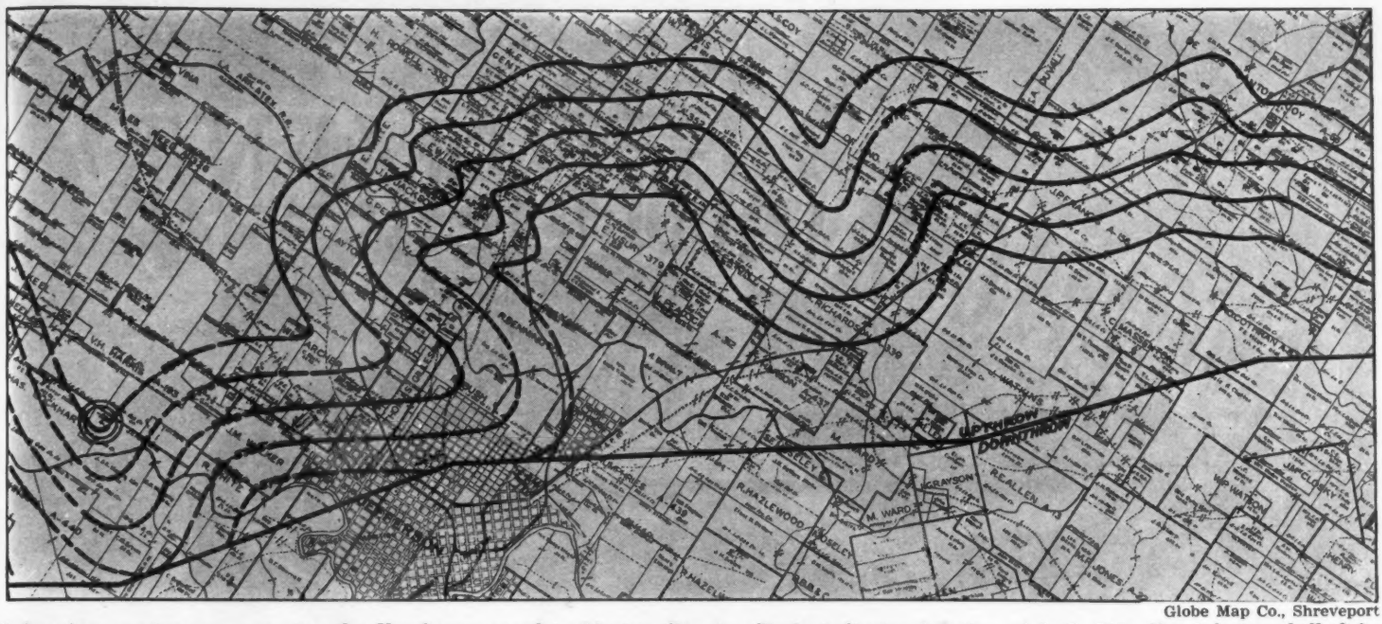

Globe Map Co., Shreveport

Subsurface contour map on top the Henderson sand in Marion County. Circle indicates location of J. C. Pitts No. 1 being drilled for the Arkansas-Louisiana Gas Co.

the two productive sands are definitely established. In the Henderson, the water table occurs at minus 5,800 feet subsea, and in the Gloyd it is encountered at minus 5,815 feet subsea. The gas-oil contact for both sections is at present at minus 5,750 feet.

In No. 1 Pitts the drill stem test showing oil in the Gloyd sand was made at minus 5,848 feet, considerably below the water table as established in Jefferson proper. This condition indicates either of two possibilities. The Gloyd section may consist of three producing sands, the body encountered in the Pitts test being the third or deepest sand of the series. Or, the area southwest of Jefferson may be complicated by a series of echelon or lateral faults which will complicate considerably the structure in the area.

Irrespective of success in making a commercial producer of No. 1 Pitts, the interest created by its discovery will have a major effect in further exploration of the area southwest of Jefferson. Late in March operators announced the wildcat will be deepened to the Travis Peak, and, pending the finding of additional information from the test, operators are making plans for other wildcats. The possibility of production in the Hill sand downdip from the outpost test is the major point of interest at present.

As in all Glen Rose formations in this district, the porosity of the producing sand at Jefferson and

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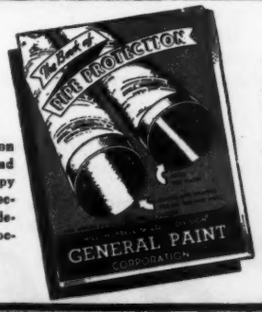

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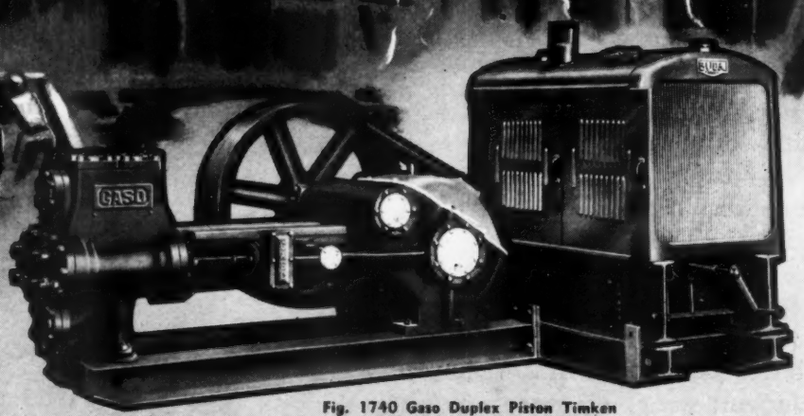

Fig. 1740 Gaso Duplex Piston Timken Bearing Power Pump, 54 to 250 Bbls.

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Lodi varies considerably. The average good Upper Gloyd section in the field runs about 15 feet in thickness, and that of the lower body, 16 to 18 feet. Between the two sands exists a section of very tight lime and shale, which averages from 5 to 6 feet in thickness. The Henderson or Upper Gloyd in the Lodi field runs from 5 to 20 feet in thickness. The probable extent of either field is yet undefined. At Lodi, however, the present water table and gas cap indicate the limits to production, parallel to the fault. Recovery of oil, determined from studies of the average porosity of the producing sections, has been placed conservatively at 450 bbls. per acre-foot.

An interesting feature of the Lower Gloyd section in the two fields indicates salt water encroachment will not be a major problem as the field's productive history lengthens. The water sand is found to have considerable less porosity than the oil body, and the porosity change occurs at the present water table level. Thus the main drive in the field will be from the gas cap, which is quite extensive in the Henderson sand. Only three wells in the fields are making water to date, and the water influx to additional producers is not expected to be of any major consequence for some time. Despite the presence of a large gas cap, careful completion practices in the upper sand have resulted in the production at large gas-oil ratios of only four wells in both fields. Pressures have declined very slightly since commercial production was begun, and the estimated pressure gradient is placed at .283 pound. The average bottom-hole pressure reported from the latest survey made by the Texas Railroad Commission is 2,459.29 pounds. This figure is represented by 17 wells tested.

Drilling Practices

The type of equipment and general drilling practices used in developing the Jefferson-Lodi area are very similar to those of the Rodessa field. Depth of the production, and pressures encountered require the use of heavy, modern rigs, and like the Rodessa field proper, Jefferson work is also characterized by heavy duty steam drilling equipment.

Due to the presence of the large gas sand above the Henderson producing section, many operators set the oil string through that section. This practice has contributed to the relatively few completions with high gas-oil production. Open hole completions are commonest in the field, but some wells have casing set through the pay and produce through perforations. The porosity of the Gloyd in the extreme southwest portion of Jefferson has averaged much less than for the main part of the field, and in that area, acidizing is required. Relatively little swabbing is usually required to bring in wells.

Since the two areas were brought into production last year, the allowable and rules and regulations for development have been similar to those laid down by the railroad commission for Cass County. At a hearing held several months ago in Jefferson, operators of the "extension" area asked for a separate classification for Jefferson-Lodi. The similarity of conditions in the southwest section and Rodessa proper, however, have made separate treatment from this standpoint unnecessary, and now, although the production in Jefferson and Lodi is listed in a separate section of the commission's allowable schedule, the determining factors are the same as those in effect in Cass County.

The proration schedule for March allocated production in Marion County at 5,976 bbls. daily, divided equally between bottom-hole pressure and acreage factors. According to the schedule issued March 1, based on a bottom-hole pressure average in the field of 2,559.8 pounds and an average density of one well to 17 acres, the average well allowable was 122 bbls. daily.

Casing records in the field follow the commission requirements for the area. One thousand feet of surface casing set approximately 400 feet into the Midway shale and cemented to the surface, is required to pass the 1,000 pounds pressure test for 30 minutes without a drop of over 50 pounds.

Oil strings, set at a point not higher than the producing sand, are required to be cemented back to the Annona chalk, sealing off the Blossom, Paluxy and Trinity sands, the red beds and the Upper Glen Rose sections.

Crude Characteristics

The crude produced in Jefferson and Lodi is essentially similar to that of the Rodessa field proper. Averaging 41-42 gravity, it contains a low octane straightrun gasoline, but a small lubricating oil fraction showing valuable qualities Gasoline, averaging 8 per cent yield has an octane number of 54, and requires 1.2 cc. of tetraethyl lead to bring it to 70 octane. A 400 endpoint gasoline shows such low octane and high lead requirements that usual practice is to cut a 325 endpoint straightrun fraction represented by the 8 per cent yield.

Cracking of the topped crude gives the following yields, based on total crude: Straightrun gasoline 8 per cent, kerosene 29 per cent, cracked gasoline 34 per cent, fuel oil 23 per cent, gas loss 6 per cent.

As the only paraffin base crude produced in this section of the country, Rodessa and Jefferson crude is at a premium for lubricating oil manufacture. A 15 per cent cut of lubricating oil shows very good lube oil characteristics. The viscosity index averages 95, comparing it favorably with the stocks from Pennsylvania crudes. A high paraffin wax content necessitates the dewaxing of this lube fraction to meet pour point requirements.

Natural Gasoline

Arkansas Fuel Oil Co. operates a newly constructed gasoline plant in the Lodi section of the field. The plant, designed to process 35,000,000 feet daily on the high side and 8,000,000 feet per day on the low side, is as yet operating considerably under capacity. About 90 per cent of the gas produced in the two areas is run to the plant.

Gasoline content in the gas production at Jefferson-Lodi averages .5 gallon per 1,000 feet and the plant's present output runs from 8,000 to 9,000 gallons daily of 22-pound natural. The capac-

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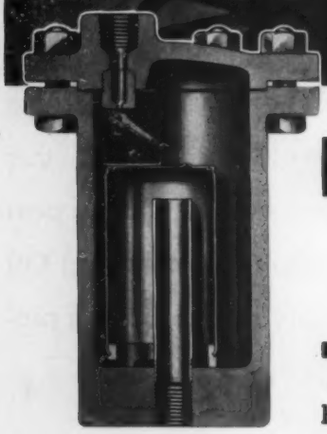

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ity of the plant will care for processing gas production in the field for some time. Development of production in the Hill sand, seen as a possibility in the new southwestern section of Jefferson, may add appreciably to the runs to the plant in the future.

To date, Gulf Pipe Line Co. operates the only outlet for crude in the field, with a 6-inch extension line from the main Rodessa field.

Three Wildcats Being Drilled In Southwestern Idaho

Three wildcats are being drilled in the Boise City sector of southwestern Idaho and considerable leasing activity is reported in that part of the state, according to Horton Abell, operator in the Kevin-Sunburst field in Wyoming, and president of the Dry Lake Oil Co. of Nampa, Idaho. Mr. Abell and J. W. Schooley, drilling contractor, came to Oklahoma to get material for one of the Idaho tests.

Dry Lake Oil Co. No. 1 Lloyd, section 5-2n-3w, the latest Idaho wildcat to be started, is about 400 miles from nearest production in Wyoming. Location is in southern Canyon County, 12 miles southwest of Nampa and about 30 miles west of Boise City. It is on a 25,000-acre block assembled by the Dry Lake company, composed of Idaho people. An 86-foot standard derrick was erected and the hole drilled to 250 feet, where 18-inch casing was set, before it was shut down for additional pipe. Contract depth is 5,000 feet, and it will test the Payette formation correlating with pay horizons in Wyoming fields.

Boise Petroleum Co. is drilling a wildcat near New Plymouth, in Payette County, north of the Dry Lake wildcat. It was around 1,000 feet at last report.

The third Idaho wildcat is being drilled 1 mile northeast of Boise City, Ada County, by Boise Dome Oil Co. It was shut down at 250 feet but operations were due to be resumed soon, following reorganization.

Five wells were drilled in the Payette district several years ago and, although none were completed as producers, showings of oil and gas were recorded at each test. The showings were in Payette formation, found at around 2,500 feet in that area. Formations in the ancient Payette Lake period consist of Miocene, Pliocene and Marine deposits.

McColl-Frontenac Operations

TORONTO, Ontario, Apr. 9.—Ranking as one of three major oil refining companies in Canada, McColl-Frontenac Oil Co. now operates refineries at Toronto and Montreal with a combined capacity of 22,000 bbls. a day. It operates three tank steamers on the Great Lakes and five ocean tankers, two under long term lease, as well as 165 tankcars and over 230 tanktrucks.

Circulating tank and separator mounted on skids and moved to each drilling well just prior to entering the producing section when drilling in

INDUSTRIES IN TEXAS

(Continued from Page 81)

centages were, respectively, 97.32 and 24.16 per cent.

The same tables show the increased rise of volumes of casinghead gas reported, volumes used for repressuring, and volumes used for carbon-black production.

Natural Gasoline

Texas became a natural-gasoline producing state in 1915 when a gasoline plant was constructed in Clay County. The first report made in 1916 showed Texas with a production of 1,293,000 gallons of gasoline annually. A continuous rise up to 1930 brought this figure to 491,299,000 gallons annually, when, of course, following the downward trend of oil production, a decline began which in 1934 was followed with a great rise in volume produced, as shown in chart on page 79 and Table 9.

For years the highest concentration of producing plants was found to be in the neighborhood of Petrolia, Olden, Desdemona and Ranger. Although the plants were great in number, they were small in capacity. Today's plants have larger capacities equivalent 10 to 15 times that of the old plants.

Today's low price for gasoline is largely offset by the greater demand for gas, which after being stripped of its gasoline content is sold to carbon-black plants and pipe lines.

Unquestionable progress has further been made in development and utilization of natural gas by natural-gasoline plants from April of 1936 to date. The amount of gasoline manufactured and the yield of gasoline per 1,000 feet of gas as is shown in the accompanying chart is positive proof. Gasoline production dropped considerably after the enforcement of the provisions of House Bill No. 266, but utilization of casinghead gas in the great East Texas field contributed a large part in the recovery of the losses in production sustained.

Gasoline yield in January of 1936 amounted to only .659 gallon per 1,000 feet (.476 in the Panhandle), but by May of 1936 it had increased to .887 gallon per 1,000 feet (.526 in the Panhandle), and for the entire state at the end of 1937 it was .905 gallon per 1,000 feet (.721 in the Panhandle). (Table 10.)

New plants have taken the place of outmoded ones, and more were shut down by exhaustion of their supplies.

At the beginning of 1936 there were 322 fields producing either natural or casinghead gas. At the end of 1937 there were 387 fields, a goodly number of which were of sufficient size and quantities to warrant new plants.

A list of plants and their capacity operating in Texas in 1936 and 1937 are listed in Table 11, with notations as to their first report, or in case of a shutdown, a notation as to their last report.

There has been a daily average increase of natural gasoline produced in the state since January, 1936, amounting to 712,000 gallons. This increase will be traced by sections of the state.

In East Texas, for the 24 months as reflected by January 1936 and December 1937 figures, the increase in daily average production was 332,000 gallons, rising from 240,000 gallons in January to 572,000 gallons in December. Production of natural gasoline in the East Texas field is primarily from casinghead gas. There are 232 gas wells connected to the plants, compared to 23,000 oil wells. The gasoline content of casinghead gas in the East Texas field has an average of 2.5 gallons per 1,000 feet,

TOTAL DRY GAS PRODUCTION FOR THE STATE OF TEXAS

(Thousands of cubic feet)

District—	1937 production	1937 No. wells producing
1	2,319,766	101
2	34,592,919	147
3	27,480,469	148
4	38,773,488	386
5	480,434	9
6	21,093,292	349
7	24,177,512	554
8	9,360,219	43
9	1,809,931	76
10	500,889,114	1,448
Total state	*660,957,144	3,261

*These figures differ from those on Table 7 due to error of measurement between parties reporting.

TABLE 6

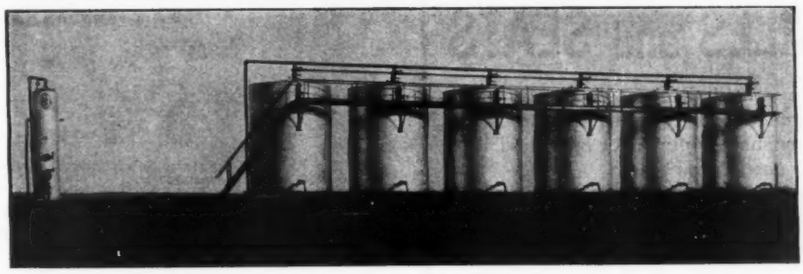
Dry sweet gas produced	47.16%		43.18%	
Gas for light and fuel		43.86%		40.43%
Dry sour gas produced	20.94		23.10	
Gas for carbon black		27.06		30.20
Casinghead gas produced*	31.90		33.72	
Gas used for repressuring		.74		2.29
Gas used for plants		11.65		13.00
Extraction losses		4.75		4.80
Gas to air		11.94		9.19
Total		29.08%		29.37%

*Could legally be wasted.

TABLE 7—STATE OF TEXAS TOTAL GAS PRODUCTION OF SOUR AND SWEET NATURAL GAS AND CASINGHEAD GAS

(Millions of cubic feet)

1937—	Sweet dry gas	Sour dry gas	Total production	Casinghead gas production	Total all gas produced
January	39,314	15,279	54,593	24,842	79,435
February	34,851	14,660	49,511	24,131	73,642
March	37,984	17,547	55,532	27,465	82,997
April	34,917	18,040	52,957	26,441	73,399
May	33,294	18,905	52,199	28,184	80,383
June	32,006	18,647	50,653	27,933	78,586
July	32,236	20,665	52,901	27,928	80,829
August	33,571	21,327	54,898	28,821	83,720
September	33,288	20,676	53,964	28,749	82,713
October	36,632	21,613	58,245	29,037	87,282
November	39,177	21,243	60,420	30,056	90,507
December	42,004	21,017	63,022	31,588	94,610
Total	429,274	229,619	658,895	335,175	994,103
	43.18%	23.10%	66.28%	33.72%	100%



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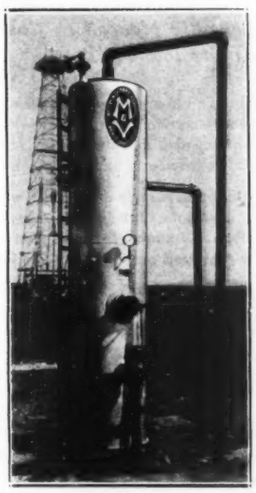

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and in some instances, notably gas produced from the pumping area, the content is as much as 6 gallons per 1,000 feet.

The propane-butane content of East Texas casinghead gas is of unusual occurrence and significance. In addition to the 26-70 gasoline production, the gas has a propane-butane content of at least 75 per cent of the amount represented by 26-70 equivalent. The December figure for liquid propane-butane marketed was 295,909 gallons per day, coming largely from the plants located in the East Texas field proper. It is possible, were the market available, that the 26-70 figure could be equaled by propane-butane production.

In the Panhandle field there were 613 dry natural gas wells producing 1,187,364,000 feet, and 2,618 oil wells producing 634,623 feet of gas, which was being processed by the plants located in that field producing 927,195 gallons of 26-70 grade gasoline. This indicates a preponderance of gasoline

TABLE 8—ULTIMATE DISTRIBUTION OF GAS PRODUCED IN TEXAS

(Millions of cubic feet)

1937—	Total gas	To pipe lines for light and fuel	Extraction losses at gasoline plants	Plant fuel lease oper.	Repressuring and recycling	Vented to air	To carbon plants
January	79,435	35,269	3,638	10,367	3,242	6,694	20,225
February	73,642	32,752	3,514	10,519	2,151	5,971	18,735
March	82,997	40,099	3,947	6,165	2,092	8,450	22,244
April	79,399	31,600	4,055	11,085	1,659	7,694	23,306
May	80,383	29,879	4,051	11,170	1,451	8,670	25,162
June	78,586	28,784	3,776	11,015	1,476	8,290	25,245
July	80,829	29,519	4,011	11,398	1,437	7,726	26,738
August	83,720	31,250	4,214	11,162	1,646	8,084	27,364
September	82,713	30,340	4,079	10,927	1,639	8,401	27,327
October	87,282	33,476	4,175	11,718	1,743	7,346	28,824
November	90,507	38,216	4,192	11,773	2,100	6,506	27,720
December	94,610	40,639	4,057	12,908	2,139	7,509	27,358
Total	994,103	401,823	47,709	130,207	22,775	91,341	300,248
	100%	40.43%	4.80%	13.09%	2.29%	9.19%	30.20%

TABLE 9—ANNUAL NATURAL GASOLINE PRODUCTION IN TEXAS

Year—	No. of plants	Natural gas treated (Mill. cu. ft.)	Nat. gasoline produced (M. gal.)	Ave. yield per M.C.F. of gas	Value at plant (M. $)	Ave. per gal.
1916	4	948	1,293	1.36	201	15.55
1926	134	181,243	243,093	1.3	22,760	9.4
1936	*125	*662,494	*608,457	*.92	†20,079	†3.3
1937	*136	*771,740	*667,034	*.86	†22,012	†3.3

*Texas Railroad Commission's figures. †Estimate by Texas Railroad Commission, engineering department. Compiled by Jack Baumel.

TABLE 10—STATE OF TEXAS TOTAL GAS TO GASOLINE PLANTS, GASOLINE PRODUCTION AND CARBON BLACK PRODUCTION

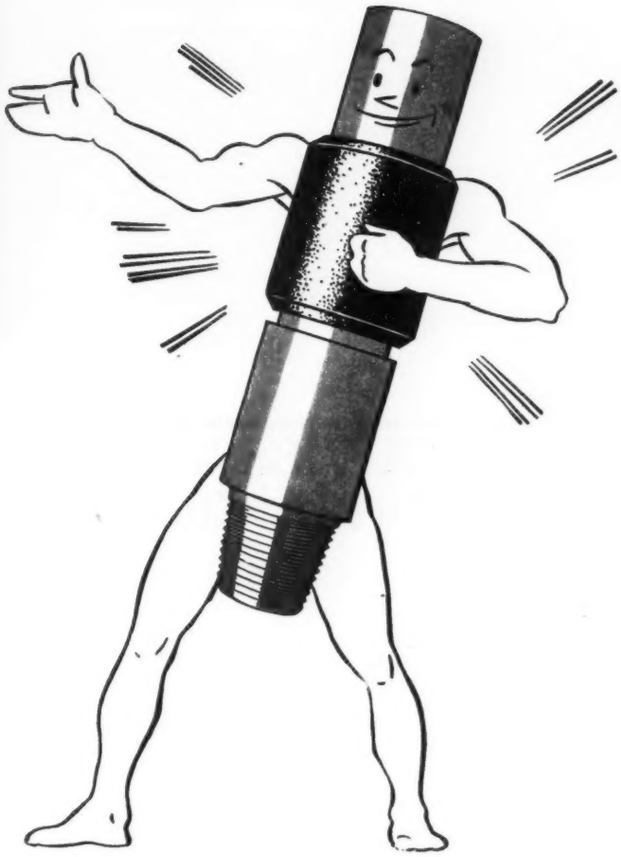
1937—	Gas to gaso. plants in Mill. cu. ft.	Gasoline produced in gals.	Butane propane prod. in gals.	Gas to carbon plants in Mill. cu. ft.	Carbon black pro. in lbs.
January	61,311	54,855,368	.....	20,224	31,613,769
February	56,748	53,677,484	.....	18,735	31,631,880
March	63,773	52,364,146	.....	22,244	35,491,931
April	62,086	56,423,490	.....	23,306	37,374,510
May	63,587	61,322,960	.....	25,162	40,978,001
June	61,805	60,480,930	.....	25,245	38,069,460
July	73,718	63,200,847	.....	26,738	37,179,788
August	55,591	67,954,883	6,490,284	27,364	37,265,348
September	65,960	65,467,140	7,086,030	27,327	37,261,980
October	69,151	70,359,243	6,128,266	28,824	40,656,655
November	72,068	60,927,270	6,644,220	27,720	39,280,560
December	70,301	63,649,944	9,637,745	27,358	39,125,968
Total		730,683,705			445,979,850

Previous to August, 1936, propane and butane production was included in gasoline production figures (26-70 equivalent).

TABLE 11—CARBON PLANTS OPERATING IN TEXAS IN 1936-1937

(By districts with capacities and dates of first reports and shutdowns)

Dist.	Company—	Plant	M.C.F. capacity 1936	M.C.F. capacity 1937	Remarks
7	Coltexo Corp.	Parks	2,750	2,750	
	Peerless Carbon	Pioneer	2,100	.....	Shut down 12/37
	Texas Elf Carbon	Eliasville	15,000	15,000	
	United Carbon Co.	Breckenridge	9,300	4,650	7/37 4,650
	United Carbon Co.	Tecain	.....	4,650	
	Total capacity		29,150	27,050	
8	Cabot Carbon Co.	Kermit	.....	30,000	1st report 9/37
	Cabot Carbon Co.	Kermit	.....	30,000	1st report 5/37
	Total capacity		.....	60,000	
10	Better Black	Danciger	300	432	
	Cabot Carbon	Armstrong	8,000	22,000	6/37 22,000
		Kingsmille	30,000	30,000	
		Schafer	50,000	50,000	
	Coltexo Corp.	Lefors	30,000	40,000	
	Columbia Carbon	Borger No. 51	25,000	25,000	
		Colphil No. 95	.....	15,000	1st report 7/37
		Kingsmill No. 60	20,000	20,000	
		Lefors No. 60	20,000	20,000	
		Lela No. 55	16,500	16,500	
		Magic No. 67	6,500	6,500	
		Pampa No. 51	3,250	3,250	11/36 3,250
		Sunray No. 59	30,000	75,000	3/37 45,000
		Wescar No. 52	60,000	60,000	
	Continental	Continental	.....	75,000	2/37
	Crescent	Borger	15,000	15,000	11/36
	Crown Carbon Co.	Crown	.....	12,000	3/37
	General Atlas	Pampa	4,000	6,000	1/37 6,000
	J. M. Huber Corp.	Borger	45,000	55,000	5/37 55,000
		Skellytown	.....	.....	Shut down 12/36
	Magnolia Pet. Co.	Magic City	.....	.....	Shut down 3/36
		Pampa	5,000	5,000	
	Moore County	Moore County	.....	30,000	1st report 5/37
	Panhandle	Borger	17,100	17,100	3/36 17,000
	Peerless	Coltexo	1,550	3,500	11/37
	Texas Elf	Bowers	50,000	50,000	
	United	Alexander	30,000	30,000	
		Combined	30,000	30,000	Formerly Combined Co.
		McIlroy	40,000	40,000	
		Norrick	15,000	15,000	
		Reliance	.....	.....	6/36
	United Carbon Co.	Rock Creek	60,000	60,000	
		Sandford A	16,000	16,000	
		Sandford B	65,000	65,000	
	Total		743,200	918,282	
7			29,150	27,050	
8			.....	60,000	
10			743,200	918,282	
	Total state		772,350	1,005,332	



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produced from dry natural gas. However, as dry gas in the Panhandle field yields less than .5 gallon per 1,000 feet, and casinghead gas yields more than 1.6 gallons per 1,000 feet, or probably four times as much, the difference in production from the two sources is not nearly as great as would be indicated by wells connected.

In West Texas, commencing with the numerous fields in Winkler and Ector counties and extending southeast to the Yates field on the Pecos-Crockett county line, is found the next largest gas-producing area in the state. Probably the greatest increase in production during the next year or two can be expected from this region since there is more promise of oil development in this area than in any other.

It is interesting to note that the oil producers in the Permian Basin, or West Texas, are exercising great caution in the development of the proven properties, there being wider spacing and much attention given to operating gas-oil ratios.

Following West Texas in importance is South Texas, or the area lying on an east-west line commencing at Matagorda Bay on the gulf and extending west through Victoria for about 100 miles, then southwest to Laredo, and from there east of the Rio Grande to the gulf. This is a widespread region with numerous oil and dry-gas fields within its limits. In general there are two important developments in South Texas, one extending from McMullen to Zapata County, with Cole-Bruni at the half-way point, and the other commencing east of Victoria and extending east to Kingsville. The low gasoline content of both dry and casinghead gas in this section of Texas has not been conducive to the construction of natural gasoline plants. There are now five plants in this area, with two under construction.

Carbon Black

Texas joined the other states producing carbon black in 1923, at the end of which three plants were found operating within its boundaries. The total Texas production for this year represented 2,633,013 pounds, or 1.9 per cent of the total production. (Chart page 81). Texas then ranked fourth in production, being preceded only by Louisiana, West Virginia and Kentucky. Previous to the entrance of Texas into this field of industry, Wyoming, Oklahoma, Pennsylvania and Montana had contributed to the world's supply in varying amounts.

In 1924 the production of carbon black in Texas came from four plants in Stephens County, the gas consumed coming from oil wells. Statutes to prevent the wasteful utilization of natural gas, restricted manufacture of carbon black to Stephens County.

Texas advanced that year to become the third largest producer by increasing the total output over five times that of 1923. In 1925 Texas moved to second place in the list of carbon-black producers, with seven plants producing approximately 14 per cent of the nation's total output.

The Panhandle gas field was opened to the carbon-black industry in 1926, and as a result one plant appeared in Hutchinson County, opening an era of unheard of industrial expansion in an area which was to become the world's foremost producer of this necessary and valuable commodity.

In 1929 Texas began its leadership of carbon-black producing states by more than doubling its production over that of 1928, and producing 62.26 per cent against Louisiana's declining production of only 34.75 per cent of the United States production. Millions of cubic feet of gas were thus converted to an easier transportable commodity.

Exports of carbon black reached a new high level in 1931, when they amounted to 96,714,000 pounds, an increase of 15 per cent over 1930. Nine plants closed in 1932, including three plants in Texas and one plant each in Montana and Utah, respectively, indicating further concentration of the industry in Texas as these two states thus disappeared from the list of producers, leaving Texas, Louisiana, Oklahoma and Wyoming as the sole competitors in this industry.

TABLE 12—STATE OF TEXAS DRY GAS PRODUCTION FOR 1936 AND 1937 WITH NUMBER OF WELLS PRODUCING IN 1937, ARRANGED BY RAILROAD COMMISSION DISTRICTS, COUNTIES AND FIELDS

(Based on 3-266 Reports)

San Antonio or South Central Texas (District No. 1)

County and field—	1937 production M.C.F.	No. of producing wells 1937
Bexar, Gas Ridge	93,324	67
Bexar, Von Ormy	.....	..
Caldwell and Guadalupe, Luling (part in each)	43,962	4
Frio, Pearsall	218,932	2
Maverick, Chittim (sour)	1,304,729	3
Medina, Medina	219,364	15
McMullen, Calliham (New) / McMullen, Calliham South	125,861	5
McMullen, Rhode	313,594	5
Total district No. 1	2,319,766	101

Refugio or Middle Gulf Coast (District No. 2)

Bee, Caesar	.....	..
Bee, Holzmark	26,484	1
Bee, Hords Creek	.....	..
Bee, Pettus (part) 3,700 ft.	248,155	11
Bee, Pettus (part) 4,200 ft.	107,707	1
Bee, Pettus, New or North	11,711	1
Bee, Pettus, Pettus sand	.....	..
Bee, Tuleta / Bee, Tuleta-West	21,534	2
Calhoun, Port Lavaca	241,031	3
Goliad (see Bee County)		
Jackson, Edna, 2,650 ft.	7,995	1
Jackson, Edna, 3,850 ft.	245,336	1
Jackson, Edna, 4,100 ft.	2,924	1
Jackson, Edna, 4,650 ft.	601,260	1
Jackson, Edna, 4,700 ft.	.....	..
Jackson, Edna, 4,820 ft.	1,266,097	3
Jackson, Ganado	47,126	1
Karnes, Burnell	760,560	6
Live Oak, Dinero	.....	..
Live Oak, Mt. Lucas	3,063,931	20
Refugio, Fox, 3,400 ft.	69,086	1
Refugio, Fox, 5,000 ft.	708,168	1
Refugio, Fox, 6,200 ft.	316,009	1
Refugio, Greta, 2,100 ft.	582,425	5
Refugio, Greta, 3,500 ft.	676,191	3
Refugio, Greta, 5,200 ft.	445,914	1
Refugio, Greta, 5,700 ft.	1,024,269	1
Refugio, O'Connor	49,279	1
Refugio, McFaddin, 2,400 ft.	.....	..
Refugio, McFaddin, 3,200 ft.	391,969	1
Refugio, McFaddin, 3,500 ft.	484,512	3

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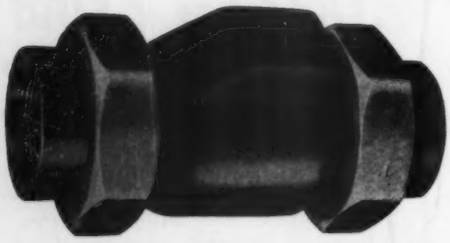

The No. 211 Valve, specially adapted for oil flow lines, has union connections at both ends of valve, enables line to be broken at the inlet end of valve while the check holds contents of the line while open. Eliminates additional union or nipple either at the outlet or inlet end of line. Relax metal integral seat standard. Hitensiloy inserted seats furnished in 2", 2½", 3" if specified. Sizes ¾" to 3".

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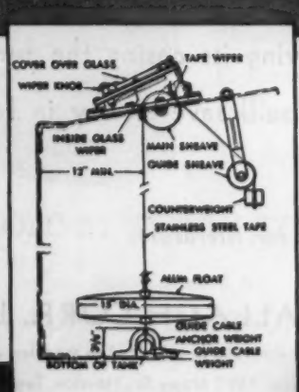

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Refugio, McFaddin, 3,700 ft.	2,280,223	5
Refugio, McFaddin, 4,500 ft.	542,918	3
Refugio, Refugio, 1,600 ft.	100,299	2
Refugio, Refugio, 1,900 ft.	.....	..
Refugio, Refugio, 2,100 ft.	.....	..
Refugio, Refugio, 2,300 ft.	41,312	1
Refugio, Refugio, 2,400 ft.	.....	..
Refugio, Refugio, 2,500 ft.	.....	..
Refugio, Refugio, 2,600 ft.	84,932	1
Refugio, Refugio, 3,200 ft.	31,125	1
Refugio, Refugio, 3,300 ft.	.....	..
Refugio, Refugio, 3,450 ft. (New)	2,598,266	9
Refugio, Refugio, 3,450 ft. (Old)	3,693,720	11
Refugio, Refugio, 3,600 ft.	1,040,528	3
Refugio, Refugio, 4,500 ft.	227,808	1
Refugio, Refugio, 4,700 ft.	393,695	3
Refugio, Refugio, 4,900 ft.	.....	..
Refugio, Refugio, 5,000 ft.	267,092	2
Refugio, Refugio, 5,700 ft.	10,407,595	23
Refugio, Refugio, 6,800 ft.	503,469	2
Refugio, Refugio, 7,100 ft.	249,037	1
Victoria, Coletta Creek or Raisin	9,927	2
Victoria, Fordtran	466,898	1
Victoria, Keeran	154,528	1
Victoria, Kemper City	13,843	1
Victoria, Telferner	63,436	2
Victoria, Placedo	22,595	1
Total	34,592,919	147

Houston or Upper Gulf Coast (District No. 3)

Austin, Raccoon Bend, 1,000 ft.	627,631	5
Austin, Raccoon Bend, 3,200 ft.	5,845	1
Brazoria, Danbury	71,946	1
Brazoria, Hastings	2,213,458	4
Brazoria, Lockridge	199,747	1
Brazoria, Manvel	504,747	2
Brazoria, Peldger	8,050,957	11
Chambers, Anahuac	89,600	4
Chambers, Seabreeze	486,159	4
Chambers, Turtle Bay	136,422	3
Galveston, Dickinson	3,376,448	8
Galveston, Gillock	1,583,199	4
Galveston, Green's Lake	25,149	1
Hardin, Arriola	6,896	2
Hardin, Silsbee	.....	..
Harris, Bammel	.....	..
Harris, Clinton	579,062	2
Harris, Eureka	1,407,264	1
Harris, Mykawa	741,170	1
Harris, South Houston	140,116	1
Harris, Tomball	3,567,093	44
Jefferson, Amelia	31,467	1
Jefferson, La Belle	165,282	1
Jefferson, Nome	398,344	6
Jefferson, West Beaumont	44,991	1
Jefferson, Cheek	10,853	1
Liberty, West Hardin	165,651	1
Matagorda, Bay City or Cleveland	148,991	1
Matagorda, Buckeye	16,979	1
Montgomery, Conroe	272,035	19
Newton, Call	2,400	1
Orange, Orange	216,381	1
Polk, Livingston	.....	..
Tyler, Spurger	17,370	1
Waller, Waller	77,370	2
Washington, Clay Creek	275,107	5
Wharton, Boling	17,379	2
Wharton, Five Corners	627,441	2
Wharton, Pickett Ridge or Lakeview	1,177,519	2
Total	27,480,469	148

Corpus Christi or Lower Gulf Coast (District No. 4)

Brooks, Alta Mesa	242,063	2
Duval, Benavides	149,082	1
Duval, Benavides (Bruni)	120,507	9
Duval, Cole-Bruni, 1,600 ft. (Cole)	.....	..
Duval, Cole-Bruni (Bruni)	3,601,713	78
Duval, Cole-Bruni, 2,300 ft.	2,623,546	22
Duval, Cole-Bruni, 2,450 ft.	94,977	2
Duval, Cole-Bruni, 2,800 ft.	13,275	1
Duval, Cole-Bruni, 2,950 ft.	296,286	1
Duval, Cole-Bruni (Kalmor-Cuellar)	180,141	3
Duval, Driscoll, 2,300 ft.	.....	..
Duval, Driscoll, 2,900 ft.	114,170	2
Duval, Driscoll, 3,300 ft.	306,084	4
Duval, Government, North	25,302	7
Duval, Government, South	310,704	6
Duval, Hoffman	511,289	6
Duval, Kholer, North (Cole)	302,406	10
Duval, Kholer, North (Uncl.)	46,534	1
Duval, Kohler, North, (2,550 ft.)	431,112	3
Duval, Kohler, North (2,600 ft.)	541,002	6
Duval, Kohler, South (Cole)	347,951	3
Duval, Labbe (2,450 ft.) / Duval, Labbe (2,850 ft.)	617,247	8
Duval, Loma Novia	249,002	5
Duval, Peters	274,698	1
Duval, Piedre Lumbre	504,988	6
Duval, Rancho Solo	16,325	1
Duval, Seven Sisters	46,431	2
Duval, Sweden	49,692	1
Hidalgo, LaBlanca	448,989	5
Hidalgo, Mercedes	150,804	1
Hidalgo, Sam Fordyce	548,375	6
Jim Wells, Armagosa (sour)	124,013	2
Jim Wells, Bentonville / Jim Wells, Capt. Lucey	920,539	9
Jim Wells, Gulf Coast	72,938	1
Jim Wells, Premont	.....	..
Jim Wells, Sandia (sour)	.....	..
Jim Wells, San Diego	.....	..
Kleberg, Kingsville	120,616	4
Nueces, Agua Dulce 1,900 L.	181,244	2
Nueces, Agua Dulce, 4,800 ft.	5,863,128	20
Nueces, Baldwin	36,193	1
Nueces, King	466,121	1
Nueces, London	36	1
Nueces, Saxet, Frio	758,466	15
Nueces, Saxet, Uncl.	216,562	4
Nueces, Saxet, 2,300 ft.	12,802	1
Nueces, Saxet, 2,400 ft.	1,023,288	5
Nueces, Saxet, 2,550 ft.	786,128	2
Nueces, Saxet, 4,000 ft.	2,399,845	13
Nueces, Saxet, 4,200 ft.	1,073,958	5
Nueces, Saxet, 4,300 ft.	505,119	3
Nueces, Saxet, 5,800 ft.	385,741	10
Nueces, Saxet, 6,300 ft.	1,373,076	2
Nueces, Saxet, 4,800 ft.	23,961	2
San Patricio, Aransas	627,576	3
San Patricio, Sinton	454,800	2
San Patricio, White Point, 1,900 ft.	391,685	5
San Patricio, White Point, 2,300 ft.	80,537	1
San Patricio, White Point, 2,550 ft.	587,252	4
San Patricio, White Point, 4,800 ft.	1,035,115	2
Starr, Guerra	374	1
Starr, Los Olmos	935	1
Webb, Car.-Tex West, 1,800 ft.	435,821	2
Webb, Car.-Tex West, 2,100 ft.	21,425	1
Webb, Car.-Tex West, 2,200 ft.	544,933	7
Webb. Car.-Tex West, 2,600 ft.	92,416	3
Webb. Cole Bruni, Bena. (part of Duval County)	.....	..
Webb, Cole Bruni, Bruni	.....	..
Webb, Cole Bruni, Kal-Cuellar	.....	..
Webb, Cole Bruni, 1,600 ft., Cole	.....	..
Webb, Cole Bruni, 2,300 ft., Bruni	.....	..
Webb, Cole Bruni, 2,450 ft.	.....	..
Webb, Cole Bruni, 2,800 ft.	.....	..
Webb, Cole Bruni, 2,950 ft.	.....	..
Webb, Laurel or Vela Clag.	477,462	2
Webb, Lopez	2,169	2
Webb, Mirando City	2,440	1
Webb, Oilton	66,759	2
Webb, Smidon or Laurel-Vela Claggett or Laurel	.....	..
Zapata, Blas Uribe	.....	..
Zapata, Comitas	5,423	2
Zapata, Cuellar, Jackson Co.	.....	..
Zapata, Hinnant	2,565	1
Zapata, Jennings, 1,200 ft. / Zapata, Jennings West, 1,200 ft. / Zapata, Jennings West, 1,400 ft. N / Zapata, Jennings West. 1,400 ft. S	636,820	4
Zapata, Lopena	3,147,492	13
Zapata, Mirando Valley	2,432	1
Zapata, South Martinez	648,588	20
Total	38,773,488	386

Dallas or Central East Texas (District No. 5)

Freestone, Cayuga-Trinity (part of Anderson Co.)	.....	..
Freestone, Cayuga-Woodbine (part of Anderson Co.)	.....	..
Freestone, Long Lake (part of Anderson Co.)	.....	..
Freestone, Red Lake	412,968	3

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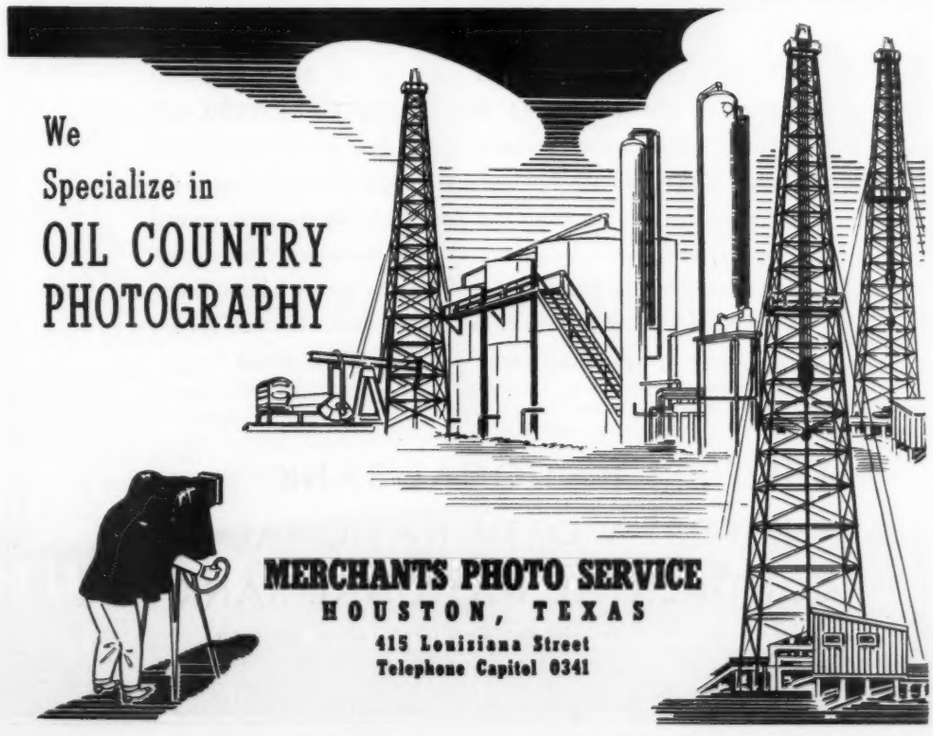

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Henderson, Cayuga-Trinity (Anderson Co.)	.....	..
Henderson, Cayuga-Woodbine	.....	..
Leon, Long Lake (Anderson Co.) (includes Old Buffalo)	.....	..
Limestone, Groesbeck	22,180	3
Limestone, Mexia	45,286	3
Total	480,434	9

Kilgore or East Texas (District No. 6)

Anderson, Cayuga-Trinity	770,054	2
Anderson, Cayuga-Woodbine	3,481,054	32
Anderson, Long Lake	4,452,181	34
Cass, Rodessa	5,135,846	26
Harrison, Waskom, 950 ft., Nac.	468,953	27
Harrison, Waskom, 1,900 ft., Blos.	306,024	21
Harrison, Waskom, 2,300 ft., Bar.	727,515	30
Harrison, Waskom, 2,800 ft., Flors.	10,600	3
Harrison, Waskom, 2,950 ft., Flors.	80,864	1
Houston, Grapeland	198,811	4
Panola, Carthage	209,978	4
Panola, Panola or Bethany, Nac. 950 ft.	325,491	43
Panola, Panola, Blos. 1,900 ft.	170,663	3
Panola, Panola, Bar. 2,300 ft.	1,599,070	73
Panola, Panola, Adams 2,700 ft.	381,538	4
Panola, Panola, Agurs 2,950 ft.	87,937	4
Panola, Panola, Tiller 3,200 ft.	378,779	4
Panola, Panola, Tiller 3,300 ft.	35,198	2
Panola, Panola, Roque 2,600 ft.	349,030	3
Panola, Panola, Roque 4,700 ft.		
Panola, Pulaski Ferry	613,388	5
Rusk, Rusk or East Texas or South Joiner	1,219,238	18
Shelby, Joaquin or Pickering	28,200	5
Shelby, Stebinger	62,880	1
Total	21,093,292	349

West Central Texas (District No. 7)

Brown, Baker	50,673	2
Brown, Brownwood—East	262,756	11
Brown, Brownwood—West	1,021,514	14
Brown, Byrd	955	1
Brown, Cross Cut or Rising Star	.....	..
Brown, Janellen	657,611	22
Brown, Starr	.....	..
Brown, Williams	257,353	2
Callahan, Baird	40,951	3
Callahan, Baird—North	40,494	3
Callahan, Clyde	.....	..
Callahan, Finley	161	1
Callahan, Putman or Old Clinton	14,969	3
Coleman, Allen	.....	..
Coleman, Burkett	24,655	2
Coleman, Morris	212,110	4
Coleman, Santa Anna	549,460	18
Coleman, South or Overall	152,269	11
Coleman, Valera	101,050	3
Comanche, DeLeon	201,671	4
Comanche, DeLeon, North	138,614	2
Comanche, Gorman	102,280	1
Comanche, Gorman, North	.....	..
Concho, Hartgrove	12,000	1
Crockett, Massie (Sour)	177	1
Crockett, Simmons	7,064	2
Eastland, Cheaney	220,823	19
Eastland, Cisco N.W.	22,697	1
Eastland, Cisco S.E.	438,967	17
Eastland, Desdemona	.....	..
Eastland, Duffer or Ranger, West	208,325	4
Eastland, Cisco	492,088	8
Eastland, Eastland	69,344	1
Eastland, Eastland, North	23,712	1
Eastland, Henderson	94,552	1
Eastland, Hogg	23,790	1
Eastland, Ledbetter	724,745	12
Eastland, Lee Ray, deep	1,572,286	35
Eastland, Lee Ray, shallow	378,425	10
Eastland, Morton or Ranger, North	38,665	1
Eastland, Olden	131	1
Eastland, Parrock	25,350	1
Eastland, Pioneer	139,401	1
Eastland, Ranger, East	90,845	3
Eastland, Ranger, Eastland	42,613	3
Eastland, Ranger, North, or Morton	.....	..
Eastland, Ranger, South	52,830	2
Eastland, Ranger, West, or Duffer	.....	..
Eastland, Schoor	20,131	1
Eastland, Sibley	14,575	1
Eastland, Sikes	111,596	3
Eastland, Sipe Spring H	433,859	10
Eastland, Sipe Spring L	185,610	10
Eastland, Taylor	108,764	1
Eastland, Tiffin	37,545	1
Erath, Laney	15,041	2
Erath, Thurber	15,671	7
Erath, Xray	1,065,410	34
Jack (South half), Bryson or Hester	1,662,225	18
Jack (South half), Bryson (New)	214,750	4
McCullock, Hall	4,747	2
McCullock, Smith	48,420	2
Palo Pinto, Boles	19,551	1
Palo Pinto, Brad	181,509	5
Palo Pinto, Brazos	52,468	17
Palo Pinto, Dalton	258,402	5
Palo Pinto, Gordon	96,460	7
Palo Pinto, Hohertz	202,868	13
Palo Pinto, Jones	5,811	1
Palo Pinto, Lone Camp	71,176	2
Palo Pinto, Marston Spur	38,553	2
Palo Pinto, Pickwick	1,033,384	14
Palo Pinto, Rector	208,531	3
Palo Pinto, Strawn	2,607,806	45
Palo Pinto, Strawn, East	698,197	6
Palo Pinto, Stuart	38,150	1
Reagan, Big Lake (Sour)	1,850,574	6
Shackelford, Albany or Muse	7,147	2
Shackelford, Ibex	1,820,852	21
Shackelford, Moran	16,802	2
Shackelford, Newell	33,248	5
Shackelford, Sedwick	4,764	3
Shackelford, Swager	11,444	1
Shackelford, Shackelford	2,430	1
Stephens, Andrews	59,830	1
Stephens, Black	.....	..
Stephens, Caddo	38,612	1
Stephens, Frankell	81,263	2
Stephens, Hohertz (part in Palo Pinto Co.	.....	..
Stephens, La Casa	161,237	4
Stephens, Lee Ray, deep	.....	..
Stephens, Lee Ray, shallow (Eastland Co.)	.....	..
Stephens, Morton or Ranger, North	.....	..
Stephens, Necessity	10,231	1
Stephens, Norton	256,638	5
Stephens, Parks	1,238,751	26
Stephens, Post	55,009	4
Stephens, Pratt	13,629	2
Stephens, Wiles	23,093	1
Throckmorton, Lee	6,090	8
Throckmorton, Woodson	21,736	1
Young (South half), Atwell	208,743	2
Young (South half), Bunger	.....	..
Young (South half), Roark	95,771	1
Young (South half), South Bend	54,170	2
Young (South half), South Young	144,862	4
Total	24,177,512	554

Midland or West Texas (District No. 8)

Andrews, Fuhrman	79,324	1
Andrews, Means	440,328	2
Andrews, Walker	800	1
Crane, Waddell (Sour)	83,809	2
Ector, Goldsmith	1,119,925	1
Ector, Penwell	2,730	1
Pecos, Bakersfield	.....	..
Pecos, Pecos Valley	37,341	1
Pecos, Yates (Sour)	25,220	2
Ward, Estes	992,934	10
Ward, Sealey (Sour)	10,180	1
Ward, South Ward	489,524	4
Winkler, Emperor	130,934	1
Winkler, Halley	47,405	3
Winkler, Hendricks	3,596,833	6
Winkler, Kermit	2,302,929	7
Total	9,360,219	43

Wichita Falls or North Texas (District No. 9)

Clay, Petrolia	294,279	37
Cooke, Muenster	1,780	2
Foard, Foard	1,051,269	3
Foard, Thalia	61,205	3
Montague, Montague	3,650	1
Montague, Nocona	397,748	30
Total	1,809,931	76

Panhandle (District No. 10)

East (Sweet)	40,857,444	
West (Sweet)	241,083,260	1,448
Sour	218,928,410	
Total	500,869,114	1,448

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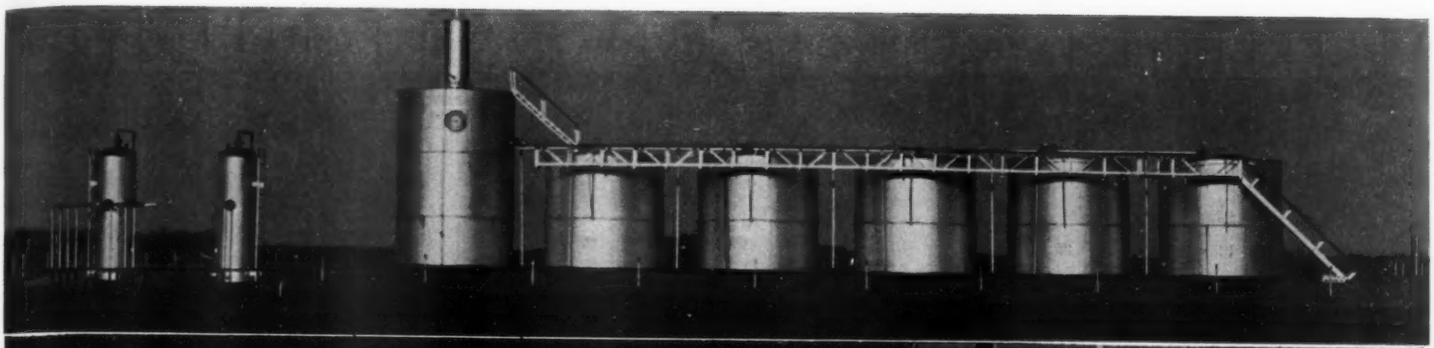

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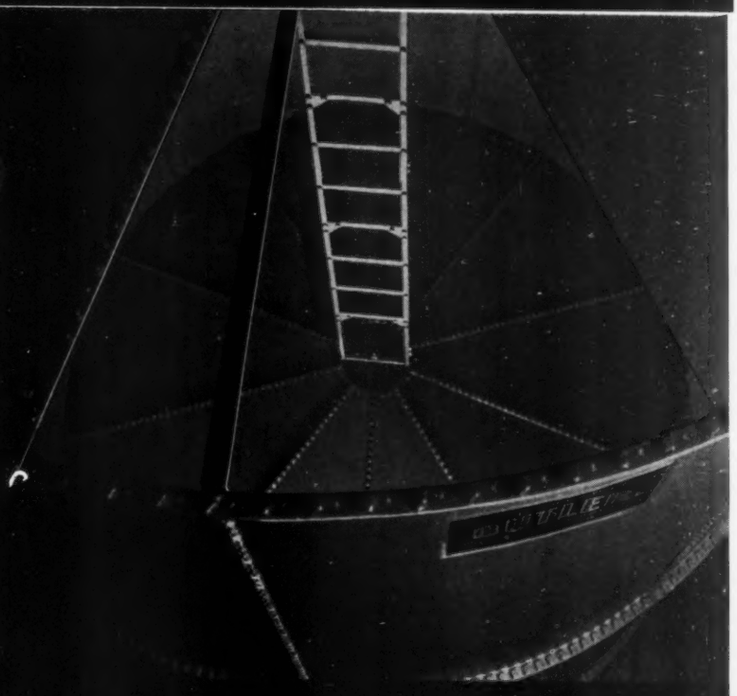

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PROBLEMS FROM READERS

Edited by L. G. E. Bignell

Resume of Problems Relating to Edgewater Encroachment

Until comparatively recent years oil producers have regarded the presence of salt water in the producing formation as a menace. It is not now particularly welcomed but it is known that if the rate of production of oil is regulated the movement of the water through the formation can be made to assist in increasing ultimate recovery of oil. Petroleum engineers and production men have been giving more and more thought to this very vital problem. It is almost universally true that salt water accompanies the oil in the producing formation and handling this usually worthless fluid adds to the cost of producing the oil.

There are several factors concerning the actual mechanism by which water aids in the recovery of oil and the rate of movement of water through the formation that are still open for further study. While the general principles governing the flushing of the oil from the sand particle by water are known the details of just how these things act in the reservoir rock are still to be developed. Rate of water movement in the reservoir is also one of the open questions and is usually solved by observation of field conditions.

In a paper presented before the annual meeting of the American Association of Petroleum Geologists recently held in New Orleans, F. G. Miller and H. C. Miller of the San Francisco, Calif., office of the Bureau of Mines, discussed the problems relating to edgewater encroachment in oil sands and discussed the development of scientific information concerning this rather vital problem of the oil producer. This has been published as Bureau of Mines R.I. 3392 and may be obtained from that department in Washington, D. C.

During the past decade petroleum technologists have given a great deal of study to the possibilities of making effective use of the inherent energy of the natural gas dissolved in or otherwise associated under pressure with the oil in the reservoir rocks. It is now generally recognized that to increase ultimate recovery of the oil it is necessary to control the gas-oil ratio during production. Low gas-oil ratios are very desirable. The gas associated with the oil in the natural state is much more effective in aiding in the recovery of the oil than gas later introduced into the reservoir pore spaces to assist in forcing part of the remaining oil to the well bore.

This study of gas-oil ratio leads to further study of control of the movement of water found adjacent to the oil in the reservoir. If full advantage is taken of the energy stored in encroaching water a natural flushing of the oil from the pore spaces can be accomplished. This is now being done in many fields by limiting the daily allowable of the wells so the formation pressure drop may be reduced to a minimum.

In many fields it is known the water-filled part of the reservoir sands is a potential source of sufficient energy to drive all of the recoverable oil to the wells. The mechanism by which water operates in driving oil through the reservoir pore spaces is not generally understood. Much study has been given to this problem and in their paper Messrs. Miller discuss the literature of this subject and point out how it has been built up to the point where there is now available much valuable data which, if more generally understood and applied, would materially increase the ultimate recovery of oil from many fields.

Physical chemists have recognized the wide variation existing between the relative attraction of oils of different physico-chemical characteristics for silica sand grains and water. Laboratory experiments have demonstrated that when two immiscible liquids are brought into mutual contact with a solid surface, the solid will be preferentially wetted by the liquid possessing the greater attraction for the solid. This phenomena has special significance in the production of oil because it indicates that water will displace most crude oils from silica surfaces under ideal laboratory conditions.

Much is known about the relative forces exerted through the wetting of sand grains by water and by oil. It can be demonstrated that water has a much greater power to wet the grain of sand and therefore will tend to remove from the surface of the sand any thin film of oil that may be clinging to it. It has also been demonstrated that through this same power to wet sand grains the water in the reservoir pore spaces will tend to move through the capillary openings and displace oil that may have accumulated in them. The force exerted by the water in wetting the sand is of appreciable magnitude and if it is permitted to act in a normal manner in the reservoir containing oil the water will tend to drive the oil out and move it toward the point of low differential pressures or the area around the well bore.

One essential thing to be considered in connection with this problem of utilizing the forces set up by interfacial tension in moving oil in the pores of the reservoir rock is the rate of movement of the water. Experiments have shown that greater efficiency of extraction of oil by water has been secured when the water moved at slow rather than at rapid rate. One authority indicated a greater percentage of oil was recovered when the rate of advance of water was approximately 61 feet per year (0.167 foot per day) than when the rate of advance was 244 feet per year or approximately 0.67 foot per day. These figures were the result of one set of experiments and are not to be taken as criteria by which to judge the rate of water movement in all sand reservoirs, because it is known there are many factors governing the efficiency of this water drive which are quite different in various pools.

Application of Water Control Theory

One outstanding example of the application of control of rate of production to a major oil field to conserve reservoir energy and cause the flushing of oil from the pore space in the formation may be found in East Texas field. Early in the life of this field operators who had had experience with Woodbine sand production in fields along the Mexia fault zone in Texas recommended care in well completions. Penetration into the Woodbine sand was kept at a minimum in order to reduce the effect of water coning as much as possible. It was early established that the zone of oil-water contact was a plane underlying the field at a depth of from 3,315 to 3,325 feet below sea level. Virgin reservoir pressure was estimated at about 1,650 pounds per square inch and was created by the hydrostatic head of water in the Woodbine sand, which outcropped between Fort Worth and Dallas and in southeastern Oklahoma and southwestern Arkansas. This sand covers an area approximately 18,000 square miles in extent and for the most part is water bearing.

With these known conditions petroleum engineers and production men familiar with the situation recommended the restricting of rate of production of the oil to conform with the rate at which formation water could move into the depleted pore space in the reservoir rock as the oil was withdrawn. If this ideal condition had been attained it is now known recovery of as much as 80 per cent of the original oil might be realized. Cores taken of complete sections of the producing formations in the East Texas field and also of the Del Rio shale and Georgetown lime underlying the field indicate that water has flushed more than 85 per cent of the oil from the lower 10 feet of the pay sand. This was due to the fact that during the early days of the field oil was produced at a rate less than the normal rate of inflow of water into the reservoir except during the period of uncontrolled production when about a million bbls. of oil per day were produced for a short period with an exceedingly rapid drop in formation pressure.

At the spring meeting of the southwestern district of the A.P.I. division of production held in Fort Worth March 24-25 Stuart E. Buckley, petroleum engineer, Humble Oil & Refining Co., Houston, Tex., presented a very interesting paper published in the April 7 issue of The Oil and Gas Journal, page 34, and discussed "Pressure Production Relationship in the East Texas Field."

In the first part of the paper Mr. Buckley reviews much literature on reservoir pressures in East Texas field, but in the last portion of the paper discusses the effect of water production on reservoir pressure. He starts with the premise that it is possible to calculate reservoir pressure of the East Texas field at any time because of two facts. First, the relation between pressure, time and the rate of water influx across the boundaries of the field has been determined and, second, due to the slight expansibility of the undersaturated oil, the oil produced is replaced by water moving in.

The rate of withdrawal of oil fluid from the reservoir is an important factor having bearing upon ultimate recovery of oil. It has been observed that sufficient water has been produced in East Texas up to January 1, 1938, to have a definite effect upon reservoir pressure. The accumulative effect as of January 1, 1937, of pressure drop attributed to water removed was only about 15 pounds per square inch but by January 1, 1938, the production of water had contributed a total of 40 pounds per square inch to the reservoir pressure decline. During 1937 the actual decline in pressure had been a total of 49 pounds per square inch whereas the oil withdrawals alone would have reduced it but 24 pounds per sq. in.

It is pointed out that the rate of water production has increased since June, 1935, in a regular semi-lograthmic manner with time. If the future rate of increase follows this same trend it is predicted the entire benefit expected to be obtained through restricted rate of oil production is in danger of being obliterated in the next two years.

FIELD OPERATIONS

Summarizing the Week's Developments

CALIFORNIA—The Turk area in Fresno County is the scene of a very active leasing play brought about by a wildcat showing, which may result in a new pool or a considerable extension to the Coalinga field. The largest of the eight new Wilmington wells started at 4,470 bbls. per day. The world's deepest well, Continental Oil Co. No. 2 Kern County Land Co., on which drilling was stopped at 15,010 feet, is being tested in the 13,000- and 14,000-foot horizons.

TEX-LA-ARK—The Magnolia pool in Columbia County, Arkansas, is an established fact and the Buckner pool in the same county was extended. Six oil wells were completed in the Jefferson-Lodi district in Marion County, Texas.

TEXAS—In the Gulf Coast district a third pay was found by the Gulf Oil Corp. in its No. 6 Ragan along the Conroe trend. The well is not yet a completion. It may result in deepening of wells in Conroe, Livingston and other pools on the trend. A large distillate well in the Labelle field, Jefferson County, is giving trouble in efforts to shut it in. It flowed 933 bbls. of distillate and 71,058,731 feet of gas. In Southwest Texas good showings in wildcats in San Patricio and Jim Wells counties encourage hope of new pools. The east side of the West Saxet field was defined, but a southwest extension is in the making. A 480-bbl. well in the Agua Dulce field is the best completion the pool has had and has revived interest there. Two shallow pools in the Laredo district are indicated by good showings in wildcats in Duval County. The opening of the Panther pool in Archer County in the K.M.A. deep sand zone has been followed by entrance of large and small oil companies leasing and purchasing. In the West Texas district a major extension to the Church-Fields-McElroy field, or a new pool, is indicated in a test 3½ miles from the field named. The Jordan pool in Ector County is being extended to the south and northwest by good wells.

KANSAS—The Kraft pool, Barton County, was extended one-fourth mile north. Wildcats in section 7-20-11w, Barton County; section 12-25-13w, and section 28-25-12w, Stafford County, and section 15-9-21w, Graham County, were preparing for potential tests. All were showing as producers. A wildcat in section 25-22-5w, made potential of 912 bbls. of oil to open a new Reno County pool.

OKLAHOMA—A pool opener was completed in section 34-21-6w, Garfield County, the farthest west producing area in the northern part of the state. A wildcat in section 1-2n-8w, Stephens County, opened a deep pool, flowing by heads from 9,086 feet. Five producers were completed in the Dora pool, Seminole County. An outpost one-half mile south of the Ramsey pool, Payne County, was dry and abandoned.

NEW MEXICO—An outpost one-half mile west of the Vacuum area, Lea County, flowed 25 bbls. of oil an hour naturally and was to be acidized. An extension well one-fourth mile southwest of Monument production was completed as a producer. A southwest edge well in the South Eunice area was completed for 240 bbls. of oil daily. Twelve producers in Lea County were completed, with one new well in Eddy County.

MICHIGAN—Allegan County, with a well that flowed 1,000 bbls. in 24 hours, following an acid treatment confirms a new pool opened recently in Monterey Township. A wildcat in Otsego Township, Allegan County, started at 200 bbls. per day.

Completions in All Fields

(Week Ending April 9, 1938)

	Oil	Gas	Dry	Total	1938 total comp. to date	1937 total comp. to date
N. Y., Pa. and W. Va.	56	11	8	75	1,327	1,174
Ohio	7	6	4	17	251	256
Indiana	0	0	0	0	25	27
Kentucky	6	0	4	10	194	31
Illinois	14	0	8	22	197	14
Michigan	7	0	4	11	191	217
Kansas	20	1	5	26	500	568
Oklahoma	18	2	12	32	458	730
Texas:						
North Central Texas	38	0	14	52	748	707
West Texas	32	0	4	36	637	662
Texas Panhandle	8	0	0	8	193	169
East Texas	41	0	1	42	665	559
East Central Texas	3	1	3	7	101	180
East Texas Border	6	0	1	7	48	122
Gulf Coast Texas	13	1	4	18	338	353
Southwest Texas	29	1	12	42	566	910
Total Texas	170	3	39	212	3,296	3,662
North Louisiana	7	2	6	15	167	113
Gulf Coast Louisiana	6	0	3	9	138	132
Total Louisiana	13	2	9	24	305	245
Arkansas	7	0	4	11	63	32
Montana	1	1	0	2	17	28
Wyoming	3	0	1	4	50	26
Colorado	0	0	0	0	1	6
New Mexico	13	0	0	13	164	208
Utah	0	0	0	0	0	0
California	13	1	4	18	374	371
Total United States	348	27	102	477	7,413	7,595
Total previous week	368	24	67	459		
Difference	20	3	35	18		

Outstanding Fields--Highlights

(Week Ending April 9, 1938)

FIELD—	Rigs up	Wells drlg.	Weekly oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS						
Hastings	4	11	3	1,313	501	19,440
McCampbell	0	6	0	0	112	5,149
Saxet	3	10	4	611	593	35,069
Benavides	4	12	3	252	170	10,212
East Texas	45	110	41	2,591	24,886	430,598
Talco	1	5	2	446	625	26,800
K.M.A.	98	158	12	12,020	249	9,710
Ector County	20	109	9	10,347	952	31,500
Winkler County	9	19	4	3,012	1,610	36,900
OKLAHOMA						
Dora	1	12	5	2,220	45	6,200
Oklahoma City	4	17	0	0	1,061	137,300
KANSAS						
Barton County	3	17	7	7,830	305	9,030
Ellis County	5	21	2	4,388	303	7,410
Rice County	4	17	3	1,904	1,134	26,010
Russell County	5	43	4	5,577	1,049	28,315
NEW MEXICO						
Lea County	9	98	12	1,858	1,685	99,850
LA-ARK-TEX						
Rodessa, Ark.	1	7	3	3,120	75	7,335
Rodessa, La.	0	6	0	0	451	41,725
Rodessa, Tex.	3	18	6	3,040	418	38,690
Lisbon, La.	3	8	2	1,490	197	10,030
Shuler, Ark.	2	19	2	2,715	39	19,880
MICHIGAN						
Buckeye	2	21	3	565	385	25,811
ILLINOIS						
Central Illinois	36	132	14	2,956	372	27,600
CALIFORNIA						
Wilmington	6	36	8	14,715	432	110,250

Eastern Field Report

By STAFF CORRESPONDENT

Eighth Good Well on Music Mountain in McKean County

PITTSBURGH, Pa., Apr. 11.—The Niagara Oil Corp. brought in the eighth big well in the Music Mountain pool in the Bradford district in McKean County, Pennsylvania, in the past week. Like the seven other wells it started with a production estimated at about 30 bbls. per hour, flowing at 20-minute intervals. The production is from a sand locally known as the Sliverville. All the wells have been shut in after completion because of the overproduction of Pennsylvania grade oil. Twenty-six operations including locations, rigs up, and wells drilling, have been started in addition to the eight completions.

SOUTHEAST OHIO

Five wells were completed in southeast Ohio of which the best producer was in Washington County, where C. D. Uhl and others' test on the John A. Huffman farm in section 22, Grandview Township, found Cow Run sand at 795 feet. It produced 30 bbls. the first day after the shot. In section 21, same township, H. E. Dickson and others completed No. 5 J. W. Pryor at 804 feet and it produced 6 bbls. the first day after the shot.

In Licking County, the Alexandria Banking Co. and others No. 4 Bert Watson in section 11, Franklin Township, is a 3-bbl. pumper in the Berea sand at 694 feet.

In Perry County, the Gas Producing Co. of Ohio completed a 400,000-foot gas well on the W. W. Porter farm in section 13, Reading Township, in Clinton sand at 3,190 feet. In section 17, same township, Hopewell Fuel & Gas Co. drilled a dry hole on the Henry Young farm through the Clinton sand at 2,941 feet.

SOUTHWEST PENNSYLVANIA

Completions in southwest Pennsylvania consisted of four gas wells and one dry hole. In Allegheny County, Heck & Co. completed a gas well on the Wattensoldos farm in Ross Township in the Hundred-Foot sand; O. Miller, a gas well in No. 3 Werner, same township, and Updegraff and others, a gas well on the Warbiic lease in that township in the Hundred-Foot sand.

In Greene County, O. I. Dille and others on the Jacob Livingood farm in Greene Township, have a gas well at 3,028 feet. The Elizabeth sand was at 2,909-27 feet with 232,000 feet of gas at 2,913 feet.

In Washington County, Bloom and others' test on the F. L. Cummins farm in Cross Creek Township, total depth 2,325 feet, was dry in all formations.

In Amwell Township, Washington County, Union Gasoline & Oil Corp. is hauling a rig to a location for No. 813, on the W. E. Craft farm in Morris Township. In Amwell Township, this company has a location for No. 814 on the Leroy Vankirk farm.

In Peters Township, R. M. Duden and others are cleaning out to deepen No. 1 P. L. Parks from 3,370 feet In Buffalo Township, same operator is ready to start the test on the Antonius Provenzano farm.

In North Strabane Township, Keystone Drilling Co. is drilling on the J. C. Beabout farm. In this company's completion on the J. M. Balentine farm in Nottingham Township, the gas is being produced from the Second Salt sand at 1,259 feet and a final gauge after shot of 490,000 feet a day.

In Beaver County, R. B. Abrams was drilling at 500 feet on the Earl Crock farm in Greene Township. In this township, the Oak Oil & Gas Co. is drilling No. 4 Mary M. Bartley.

In Allegheny County, South Penn Oil Co. is down 1,900 feet in No. 1 Jane Ryan in Penn Township and is in the Hundred-Foot sand. In Ross Township, Mendell & Co. are shut down in the sand in the test on the Mendell lease.

Greene County

In Center Township, the Carnegie Natural Gas Co. had reached 2,875 feet in the No. 3 J. H. Orndoff. J. B. Orndoff was drilling at 1,010 feet at the No. 2 G. M. Scott.

In Washington Township, the Equitable Gas Co. has reached 2,438 feet in the No. 2 Sadie A. Connor with the Big Injun sand at 1,888-2,156 feet and four bailers of water an hour at 1,899 feet. In Springhill Township, the Taylor Oil & Gas Trust is drilling at 3,075 feet at No. 5 John Taylor.

Deep Tests

The rotary test of the Peoples Natural Gas Co. on the John S. Marshall farm on the Grapeville anticline in Penn Township, Westmoreland County, had reached 1,250 feet, and shut down to ream and run 400 feet of 13⅜-inch casing. The Big lime, Injun sand, and Squaw sands have been drilled through and though hard, causing the changing of rock bits several times, caused no trouble.

In West Deer Township, Allegheny County, the rotary test of South Penn Oil Co. and others on the Fred Backhaus farm is spudding in. The power in this case, unlike the Westmoreland County rotary test which is using gas engines, will be superheated steam.

On Chestnut Ridge, the test of the Greensboro Gas Co. is drilling at 3,890 feet on the J. R. Thompson farm in Wharton Township, Fayette County. In North Union Township, the test of Wasson & Co. on the J. H. Sorg farm is drilling at 2,000 feet. In Springhill Township, the test of the L. J. Houze-Convex Glass Co. is shut down at 482 feet with the Big Injun sand at 100 feet and fresh water from that and the Berea sands. It is on the Paul Dunham farm near Wymps Gap.

WEST VIRGINIA

Three oil wells were completed in West Virginia during the week, one of which was the best in many weeks. In Grant district, Ritchie County, Joseph Parks (Cornelia Storrs), Snyder Brothers and others completed a test on the Merle Carpenter farm in the Injun sand at 1,795 feet and it is flowing 50 bbls. a day. The sand was not drilled through.

Gas Wells

In Gilmer County, the test of the Massey & Jarvis Drilling Co. on the Collins and Weaver lease in DeKalb district, is a gas well in the Injun sand at 2,010 feet. It gauged 1,650,000 feet a day.

In Braxton County, the Pittsburgh and West Virginia Gas Co. drilled a No. 7637 on the M. E. Ramsey farm in Birch district to 2,025 feet, through the sand into slate, and it was dry.

In Lincoln County, Blue Ridge Gas Co. completed No. 52 Walter Scraggs from 2,045 feet to 3,344 feet. It produced 220,000 feet of gas per day at 3,230-40 feet.

In Pleasants County, L. E. White drilled No. 7 R. H. Brouse in Washington district through Cow Run sand to 950 feet. It was dry and abandoned. In Union district, the Grant & Atha Oil Co. drilled No. 3 J. R. Smith through that formation to 625 feet and it was dry.

In Ritchie County, Bachelor Oil Co. drilled No. 9 Jacob McCullough in Clay district through Maxton sand to 1,659 feet and it showed about one-half barrel of oil. It was plugged and abandoned.

In Wirt County, Glen W. Roberts completed No. 7 W. C. McConaughey in Burning Springs district in the Keener sand at 1,708 feet. It is a gas well gauging 1,000,000 feet a day.

In Wood County, the Bull Creek Oil Co. on the Harry Hines farm in Union district drilled to 800 feet. There was an oil showing, but it was abandoned.

In Doddridge County, Broadwater & Wilson on the W. F. Squires farm in Central district had Maxton sand at 1,949-85 feet and 3 bbls. a day at 1,958-69 feet.

In Nicholas County, Hope Natural Gas Co. No. 7805 Thompson Land & Coal Co. in Jefferson district was dry and abandoned at 1,642 feet.

Oriskany Gas Field

Three wells were completed in the Oriskany gas field in Kanawha County. In Poca district, Godfrey L. Cabot, Inc., completed one on the G. G. Dawson farm at 5,089 feet with the Oriskany sand topped at 5,073 feet and a final gauge of 15,550,000 feet a day. In this district, Pitmar Gas Co. completed the northern test on the Albert Moore farm at 5,101 feet with the Oriskany sand topped at 5,094 feet and a gauge of 5,500,000 feet a day which enhances the territory intervening between the James A. Haynes gas well on the eastern flank and that on the John Kidd farm.

In Poca district, the United Carbon Co. completed the test on the Eulah Miller and others farm at 4,968 feet with the top of the Oriskany at 4,955 feet and a final gauge of 8,269,000 feet a day.

One new test was announced in this district. Godfrey L. Cabot, Inc., has a location on the Helen M. Hoge farm with a surface elevation of 782.5 feet. This operator has not yet started the test on the Poca Coal Land Co.

New Work and Operations

In Jackson County, the Cunningham Gas Co. has started drilling on the E. F. Cunningham farm in Ripley district. In this district, the C. F. Goble Oil Co. has a location on the Boyd E. Warne farm. Both are going to test the Injun sand gas found in the test on the W. T. Chancey deep test.

In Calhoun County, McIntosh & Grimm made a location on the R. M. Marshall farm in Sherman district. In Gilmer County, C. F. Wilson will drill on the R. E. Campbell farm in Glenville district.

In Pleasants County, R. L. Deem and Adam Ward have a location for No. 3 Cassie Dye in Washington district; in Lafayette district, Cox Farm Oil Co., a location on the Jacob and Nina Cox farm. In Ritchie County, Glenn F. McBurney, a location on the Flanagan Heirs farm in Clay district with an elevation of 949.5 feet.

In Gilmer County, Center district, H. B. Scott and others have a rig standing on the Worthey Moore farm; in Glenville district, E. L. Bush, location on the Harry Simmons farm and building a rig; DeKalb district, Hope Natural Gas Co., location on the C. O. Rafferty farm.

In Boone County, the Pure Oil Co. has a rig up for No. 283 Williams Coal Co.; making road to No. 286 and 287 in Cabin Creek district; Sherman district, same company, drilling at 1,543 feet in No. 284 Williams Coal Co., and has rig up for No. 285, and a location for No. 42 Robson, Lafollette, and Prichard.

In Nicholas County, Jefferson district, Hope Natural Gas Co. is down 1,530 feet in No. 7795 Federal Coal Co.; Hamilton district, Hamilton Gas Co., drilling at 2,210 feet in No. 5 Kinney Hawkins Estate.

In Cabell County, McComas district, Mountaineer Gas Co. made a location on the Burrell Nelson farm; Templeton Gas Co., down 500 feet in No. 1 Ottie Browning; Lower Toms Creek Gas Co. at 1,410 feet on the Boyd Hash farm and rigging up the W. S. Rogers and others test; Burnie Curry, drilling at 1,625 feet on the Clyde McKenry farm; D. R. Campbell, at 1,943 feet in the Gilbert Holton test; Holton Gas Co., at 1,625 feet and fishing in No. 2 Effie Phipps and others; Skidmore & Jett, reaming at 1,760 feet in No. 2 L. D. Kress and location made on the L. A. Roberts farm; Empire State Gas Co., down 3,000 feet on the T. L. Swann land; Henry Hatfield, started drilling on the Leslie Hatfield land; W. C. Kingery and others, down 1,400 feet in No. 2 Millard Pratt Heirs; Grant district, R. H. Adkins, Trustee, part of material on the ground for the James Beckett test.

Oklahoma Operations

By DAL DALRYMPLE

Stephens County Test Flows By Heads to Open Deep Pool

Another deep oil pool for southern Oklahoma apparently has been opened northwest of Marlow in Stephens County, at Coline Oil Co. No. 1 Johnson, SW NE NE section 1-2n-8w. It is on a 3,000-acre block of leases.

The wildcat began flowing by heads last Friday night, making five-minute heads every 10 to 15 minutes, the production amounting to 10 to 15 bbls. of oil per head, through tubing. It started flowing after a bridge near base of 5-inch pipe at 8,997 feet had been knocked loose, and the swab run two times. The following morning the crew began cleaning the hole. It was thought the bridge had been broken up and lodged again at base of tubing, with a caving hole accounting for the bridge.

Drilling was started at the wildcat in October, 1936, with contract depth of 6,500 feet, where it was shut down. Later it was deepened to 10,001 feet, and when nothing was showing at bottom it was plugged back to 9,086 feet and casing set. It was acidized and shot.

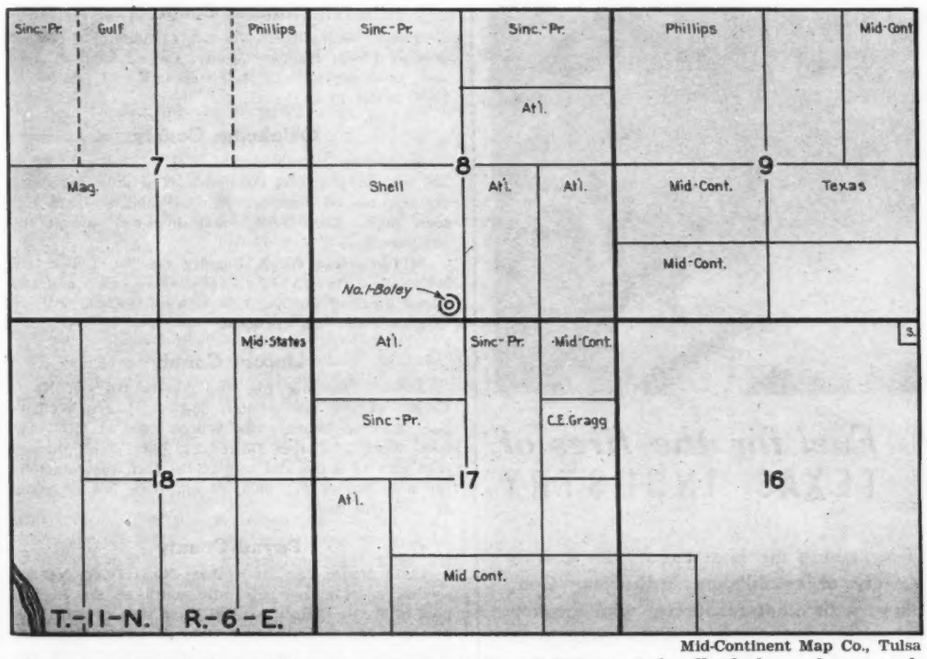
Several tests have been started near Ketchum, in Craig County, where shallow oil production was found when a water well was deepened. The discovery well was West Brothers No. 1 Minnie Gregory, CEL SE SW section 26-24-21, at the northeast corner of the town. It pumped 24 bbls. of oil in 24 hours after acidizing lime pay at 259-279 feet.

Wildcat Operations

The Garfield County pool opener drilled by H. R. Hollenback, Nels Burton and associates at No. 1 Clark, NW cor. section 34-21-6w, was listed as a completion at 7,336 feet, total depth, the past week. Production was from Marshall sand at 7,260-80 feet, through perforations. After shooting and acidizing, it had initial production of 294 bbls. of oil in 19 hours, and was flowing an average of 200 bbls. of oil daily through tubing choke when completed. It is being operated by Waukomis Oil Corp.

Maradun Oil Co. and others No. 1 Moore, SE SW 1 Hawthorne, SW SW SE section 19-7-10, Hughes County; H. W. Weir and others No. 1 Hayes, SE SE NW section 23-7s-7w, Jefferson County; W. & P. Oil Co. No. 1 Worsham, NW NW SE section 15-4s-10w, Cotton County; and Doyle Petroleum Co. No. 1 Huffine, NW NW SE section 30-5-8w, Grady County.

New wildcats: Indian Territory Illuminating Oil Co. No. 1 Osage, SW SW NW section 7-24-7, Osage County, location; Sinclair Prairie Oil Co. and others No. 1 McQuain, NE NW NE section 22-19-1e, Payne County, location; First National Oil Co. No. 1 Butterly, NE NE SE section 22-1n-1e, set surface casing at 40 feet, waiting on cement at 45 feet; Indian Territory Illuminating Oil Co. No. 1 Bailey, NW NW NE section 2-12-5, Lincoln County, building rig; Gilbreath & Dutton No. 1 Wolf, C SE SW section 8-1n-2e, Murray County, cellar and pits; Jim Turner No. 3 Collins, SE SE NE section 18-4s-10w, Cotton County, location.



Mid-Continent Map Co., Tulsa

Work has started at a wildcat in section 8-11-6, northwest of the Keokuk pool, in northeastern Pottawatomie County

The Ramsey pool in Payne County claimed attention the past week, with one well a half mile south of production being dry and abandoned and four other wells nearing decisive depths. J. E. Crosbie, Inc., No. 1 Fruin, SE SE NW section 13-18-1e, one-half mile west of production, topped Mississippi lime at 4,660 feet, about 122 feet lower than in the Brandon producer in the pool, and was drilling ahead below 4,725 feet in lime. Sun Oil Co. and others No. 1 Scafe, SE SE NE section 12-18-1e, nearly 1 mile north of the pool, was drilling below 3,900 feet and running about 36 feet lower structurally than the discovery well. Mid-Continent Petroleum Corp. and others No. 2 Ramsey, NW SW NW section 18-18-2e, north offset to the discovery well, was drilling at 4,402 feet, checking 2 feet higher than the discovery, and same operators' No. 2 Columbia Wetzel, NE NW SW section 18-18-2e, topped Hunton lime at 4,534 feet, some 25 feet higher than the discovery well, and was drilling below 4,612 feet.

NW section 17-18-1e, wildcat about 5 miles southwest of the Ramsey pool in Payne County, had first Wilcox sand at 5,280-5,315 feet, and was dry and abandoned at 5,325 feet, total depth.

W. T. Shelton No. 1 Chapman, C NW NW section 26-4s-6, Johnston County wildcat, was bottomed at 3,176 feet, plugged back to 2,204 feet, tested water and was abandoned.

H. I. Grimes and others No. 1 Hall, SW NE SW section 12-3s-19w, wildcat in Tillman County, topped Canyon lime at 3,470 feet and was dry and abandoned at 4,020 feet, total depth.

Anderson-Prichard Oil Corp. No. 1 Hancock, SE SE NW section 23-6-15w, wildcat in Kiowa County, topped Woodford shale at 540 feet and was dry and abandoned at 803 feet, total depth.

The following wildcat locations were reported abandoned: E. J. Shaffer and others No. 1 Rudolph, NE NE SW section 27-29-1w, Kay County; Dan Rives No.

Estimated Daily Production

Estimated daily production for Oklahoma for the week ending April 9, and for the preceding week was as follows:

	Barrels	
	April 9	April 2
Allen	5,375	5,725
Billings	7,450	7,675
Burbank	7,500	7,550
South Burbank	11,250	11,100
Balance Osage	18,800	18,750
Blackwell district	4,800	4,750
Bristow-Slick	6,875	5,900
Chandler	2,325	2,350
Crescent	6,150	7,025
Cromwell	3,200	3,250
Cushing-Shamrock	10,500	10,750
Duncan district	3,775	3,800
Edmond	6,650	6,800
Fish	3,825	3,975
Fitts	55,800	59,725
Jesse	3,450	3,475
Graham	5,200	5,250
Gray	1,000	1,000
Healdton	9,325	9,350
Hewitt	4,125	4,150
Keokuk	5,000	6,250
Konawa	1,450	1,375
Lucien	11,975	12,575
Moore	7,175	6,925
Oklahoma City	137,300	102,700
Olympic	6,775	6,525
Ramsey	800	775
Sasakwa	1,750	1,725
Sholem-Alechem	2,950	3,000
Seminole district:		
Bowlegs	9,150	10,025
Carr City	4,075	4,050
Dora	6,200	5,500
Earlsboro	5,225	5,250
South Earlsboro	550	525
East Earlsboro	5,400	5,450
Little River	7,650	8,475
East Little River	800	925
Maud	625	850
Mission	1,600	1,700
Seminole	8,075	8,125
East Seminole	1,725	1,675
Searight	3,525	3,525
Total Seminole	54,600	56,075
St. Louis-Pearson	19,575	18,775
Tatums	3,700	3,750
Tonkawa-Garber-Thomas	4,350	4,400
Wewoka	2,475	2,450
Yale-Jennings	3,750	3,775
Other pools	77,000	77,450
Total Oklahoma	518,000	491,875

Seminole County

The Dora pool in Seminole County continues one of the busier areas in Oklahoma, five producers being completed in that sector the past week.

Troup & Hall No. 2 Snyder, NE NE NW section 4-6-6, Dora pool, flowed 465 bbls. of oil in 4 hours and 10 minutes after shooting, with daily rating of 1,820 bbls. It was a Boggy sand producer, bottomed at 2,863 feet.

Winkler & McQueen No. 1 Bruner, NW NW NE section 4-6-6, had Boggy pay at 2,758-2,855 feet, tota. depth, and flowed 250 bbls. of oil in 24 hours.

Francis Oil & Gas Co. No. 1 Harris, NW cor. section 4-6-6, had Boggy sand pay at 2,860-76 feet, was shot and swabbed 5 bbls. of oil in 24 hours. It was

bottomed at 2,904 feet and plugged back to 2,876 feet.

J. F. Smith No. 3 Harryman A, SE SW SW section 33-7-6, was shot and flowed 900 bbls. of oil in 24 hours from Boggy pay at 2,833-2,910 feet, total depth.

Same operator's No. 2 Harryman B, SW SE SW section 33-7-6, found Boggy sand at 2,798-2,897 feet, total depth, was shot and flowed 600 bbls. of oil in 24 hours.

Shepard and others No. 2 Scroggins, SW cor. section 34-7-6, was dry and abandoned at 900 feet.

Simpson & Roodhouse No. 1 Jackson, C SW NE section 15-6-6, had second Wilcox sand at 3,950-4,000 feet, total depth and was dry and abandoned.

W. B. Pine No. 6 Williams, NW NW NE section 22-6-6, topped Viola lime at 3,590 feet, was bottomed at 3,633 feet in lime, and flowed 600 bbls. of oil in 10 hours.

Winona-Jarvis & Holm No. 2 Barkus, NW SE SE section 18-7-8, had Cromwell sand at 3,166-70 feet, total depth, water intruded and it was abandoned.

W. B. Pine No. 6 Cheparney, NW NE SW section 12-5-7, swabbed 250 bbls. of oil in 24 hours from Wilcox sand at 4,285-4,300 feet, total depth.

Vierson Oil & Gas Co. No. 1 Community, SE NW SW section 25-5-7, had Gilcrease sand at 2,245-59 feet, total depth, was shot and pumped 8 bbls. of oil daily.

Pure Oil Co. and others No. 5 Strothers, SW SW NW section 26-9-6, an old well, was plugged back to 2,375 feet, ripped casing, shot, pumped 26 bbls. of oil and 97 bbls. of water daily and was recompleted.

Indian Territory Illuminating Oil Co. No. 4 fee, NE NW SW section 13-8-6, an old well, was deepened from 4,126 feet to 4,213 feet, shot and pumped 90 bbls. of oil daily, recompleted.

New work in Seminole County: Vierson Oil & Gas Co. No. 3 Factor, SE NW SW section 25-5-7, drilling at 1,715 feet; Magnolia Petroleum Co. No. 1 Merrell, SW SE NE section 34-6-5, cellar and pits; C. E. Davis No. 1 Slaughter, NE NW SW section 34-6-5, cellar and pits; Wood Oil Co. and others No. 1 Harjo, NE NE SE section 2-8-6, location.

Pottawatomie County

Magnolia Petroleum Co. No. 2 Billington, SW NW SW section 36-7-4, St. Louis district, Pottawatomie County, topped Dolomite at 4,200 feet and had pay at 4,227-30 feet, total depth. It was acidized, swabbed 225 bbls. of oil and 300 bbls. of water in 24 hours, and pumped as high as 586 bbls. of oil and 1,500 bbls. of water in 24 hours.

Phillips Petroleum Co. No. 4 Fried, NW NE NE section 23-7-4, had Calvin sand pay at 3,115-27 feet, total depth 3,128 feet, and flowed 263 bbls. of 42-gravity oil in the first 17 hours.

British-American Oil Producing Co. No. 1 West, SE SW NW section 26-6-4, Gray pool, topped Wilcox sand at 3,805 feet and was dry and abandoned at 3,811 feet, total depth.

Elbar Corp. No. 2 Hathcock, SW SE SW section 11-7-4, was moving in rotary. F. W. Cooper No. 1-A Town Lot, SW cor. section 14-7-4, had dug pits.

Pontotoc County

United Petroleum Co. No. 1-A Fleming, SW SE SE section 12-5-4, Beebe pool, Pontotoc County, an old well bottomed at 2,610 feet, was cleaned out and acidized and swabbed 48 bbls. of oil in 6 hours and pumped 48 bbls. of oil in 24 hours, recompleted.

W. A. Delaney and others No. 1 Perrine, SE NW NW section 27-5-5, was dry and abandoned at 2,504 feet, total depth.

Sinclair Prairie Oil Co. No. 21 Burris, NW cor. section 27-2n-7, an old well in the Fitts field, was plugged back from 2,665 feet to 2,635 feet, shot and flowed 247 bbls. of oil in 24 hours, recompleted. It had Cromwell sand at 2,590-2,630 feet.

First reports of new operations in Pontotoc County: Patsy Oil Co. No. 2 Meharg & West, SW SE SW section 21-2n-6, West Fitts, was moving in tools; H. L. Blackstock No. 2-A Craddock, SW NE SE section 25-2n-6, Fitts field, moving in tools; Magnolia Petroleum Co. No. 9 Norris, NE NW SE section 25-2n-6, cellar and pits; same company's No. 39 Metropolitan Life, SE SE SE section 22-2n-7, derrick.

Hughes County

Hanna & Reynolds No. 1-A Criswell, SE NW SE section 11-9-8, Hughes County, topped sand at 1,827 feet, total depth 1,843 feet, was shot and pumped 20 bbls. of oil in 24 hours.

Oklahoma County

Southwest Petroleum Co. No. 1 Shelton, SW SE NE section 35-12-3w, Oklahoma City area, Oklahoma County, topped Hammer Handle sand at 6,215 feet, total depth 6,358 feet, water intruded and it was abandoned.

Mid-American Oil & Royalty Co. No. 1 Bell, SW NW NW section 15-12-3w, was digging cellar and pits. Pierce Drilling Co. No. 1 Woodward, SE SE NW section 15-12-3w, had spudded.

Lincoln County

Summit Drilling Co. and Skelly Oil Co. No. 1 Erwin, SE SW SW section 35-15-2e, North Wellston pool, Lincoln County, had Wilcox sand at 5,100 feet, total depth 5,115 feet, flowed 236 bbls. of oil through casing in 18 hours and was acidized. It was completed for potential of 411 bbls. of oil, with gas estimated at 1,500,000 feet.

Payne County

E. H. Moore, Inc., and others No. 1 Boyd, NE cor. section 28-18-1e, one-half mile south of the Ramsey pool in Payne County, topped Viola lime at 4,893 feet, Simpson Dense 4,940 feet, Dolomite 4,956 feet, first Wilcox sand 4,963 feet, second Wilcox sand 5,070 feet, and was dry and abandoned at 5,078½ feet, total depth. It ran low structurally in comparison with producers in the pool.

Osage County

Powers & Quinlan No. 11 Osage, SE cor. section 26-24-8, Osage County, pumped 4½ bbls. of oil daily and was completed in Chat at 2,165-96 feet, total depth.

Wolverine Oil Corp. and others No. 6 North Avant Unit, NE NW SE section 31-24-12, an old well bottomed at 1,762 feet, was shot and reconditioned, pumped 3 bbls. of oil and 21 bbls. of water daily and was recompleted.

M. L. Brenner No. 2 Osage, SE SE NW section 1-22-9, was a location. Forty-five Oil Co. No. 41 Osage, SE NE NW section 5-25-12, was a location. Sinclair Prairie Oil Co. No. 2 Osage, NW NW SW section 22-25-6, was a location.

Kay County

Clarke Nye and others No. 3-A McCullough, NW

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SW SE section 5-28-1w, Braman area, Kay County, an old well, was deepened from 3,482 feet to 3,508 feet, perforated casing and pumped 102 bbls. of oil and 10 bbls. of water in 24 hours.

Texas County

Hardendorf & Kuhn No. 1 Wiggins, C NW section 1-2n-14ecm, Guymon area, Texas County, had gas pay at 2,670-2,763 feet, total depth, gauged 15,400,000 feet of gas daily and was completed.

Pittsburg County

Utilities Production Corp. No. 2 Stringer, C SE NE section 21-7-17, northeastern Pittsburg County, had sand at 2,540-90 feet, total depth 2,631 feet, plugged back to 2,590 feet and was shot. It produced 1,050,000 feet of gas daily.

Carter County

Magnolia Petroleum Co. No. 78 Richards, SW NE section 6-4s-3w, Healdton field, Carter County, was bottomed at 1,164 feet, shot Deese pay at 1,143-64 feet, and pumped 82 bbls. of oil daily.

Shell Petroleum Corp. No. 18 Harton, SE SW NE section 6-4s-3w, had sandy lime at 1,201-12 feet, total depth, plugged back to 1,209 feet, and pumped 15 bbls. of oil and 7½ bbls. of water daily.

Sinclair Prairie Oil Co. No. 31 Ardworth, NE NW NW section 10-4s-3w, had initial production of 40 bbls. of oil and 60 bbls. of water, after plugging back from 1,060 feet, total depth, to 1,040 feet.

Robert Swan No. 5-A Ratliff, NW NW SW section 28-1s-2w, was dry and abandoned at 593 feet, total depth.

Sinclair Prairie Oil Co. No. 20 Mullin, NW NE SE section 4-4s-3w, Healdton pool, was a machine.

Tillman County

Indian Territory Illuminating Oil Co. No. 2 Dickey, SE NE NW section 1-3s-19w, Frederick district, Tillman County, topped Canyon lime at 3,086 feet, total depth 3,100 feet, and flowed 306 bbls. of oil through tubing in 24 hours, completed.

Additional New Work

In Logan County, Eason Oil Co. and others No. 1 Downing, SW SW NE section 12-17-1w, Langston pool, was a location; Ohio Oil Co. No. 2 Knight, SW NE SW section 12-17-1w, was a location.

In Garvin County, Fred Gilbreath and others No. 1 Wolfe, C SE SW section 8-1n-1e, wildcat, had dug cellar and pits.

In Caddo County, Ray Stephens, Inc., No. 2 Thompson, NW cor. section 27-6-10w, Cement field, was a location; Magnolia Petroleum Co. No. 8 Hedlund, NE NW NE section 11-5-9w, an old well, deepened from 5,404 feet to 5,757 feet, was flowing wild, producing an estimated 100,000,000 feet of gas; Ray Stephens, Inc., No. 4 Griffin, NW NW SE section 27-6-10w, was building derrick.

In Stephens County, L. F. Jones and others No. 8 Hardin, SW SW NW section 30-1n-8w, was a location.

In Comanche County, Theimer and others No. 26 Brokan, SW SW NW section 30-2n-10w, was drilling below 196 feet; Wilson & Hubbell No. 1 Allen, NE cor. section 28-2n-10w, was drilling below 180 feet.

In Jackson County, O. P. Burnham No. 1 Ellis, NW SW NE section 6-1s-19w, was a location in the Tipton pool.

In Kiowa County, Anderson-Prichard Oil Corp. No. 1 Crabbs, SE SE NE section 28-7-19w, wildcat, had tools on ground.

N. Y.-Penn. Gas Fields

COUDERSPORT, Pa., Apr. 11.—Three wells were completed in the New York-Pennsylvania Oriskany sand fields during the past week, only one of which was a producer.

New York State Natural Gas Co.'s test on the Lyle Wheatcraft farm in Woodhull Township, Steuben County, New York, at a total depth of 3,899 feet had an initial open flow of 4,500,000 feet after shot. The sand was topped at 3,880 feet and the first gas showing was found at 3,882 feet. The open flow before shot was 2,500,000 feet; initial rock pressure 1,620 pounds.

New York State Natural Gas Co. plugged and abandoned its test on the S. H. English farm in Van Etton Township, Chemung County, New York, at 3,362 feet. The Oriskany, found at 3,222-92 feet, was dry.

French and others abandoned their test on the H. O. Perry farm, Genesee Township, Potter County, Pennsylvania, when salt water was encountered 4 feet in the Oriskany. This test found the Tully at 4,466-4,520 feet, the top of the Onondaga at 5,076 feet and the top of the Oriskany at 5,114 feet. The total depth was 5,118 feet.

Pennsylvania Operations

Drilling was begun on another Pennsylvania test during the past week when Hanley & Bird spudded in their hole on the Flora Rooks farm, Harrison Township, Potter County. In other operations in this county, New York State Natural Gas Co. is ready to spud in on the J. D. Morley farm, elevation 2,301 feet, Bingham Township; New Penn Development Corp. has rigged up on the James Hill farm, West Branch Township; Williamsport Oil & Gas Co. remains idle on location on the U. B. Russell farm, Sharon Township, and New Penn Development Co. is still shut down at 5,700 feet on the Haupt farm in West Branch Township.

New York State Natural Gas Co. is drilling at 3,535 feet on the W. A. Simmons farm, Brookfield Township, and has a location on the L. Dickinson farm, elevation 1,447 feet, in Gaines Township, both in Tioga County. Even and others remain shut down at 4,553 feet on the Dusenberry farm, Watson Township, Warren County, as are McKenry and others, at 4,429 feet on the Stellman farm, Rockland Township, Venango County.

New York Operations

Five tests are now drilling in the Woodhull field of Steuben County: G. L. Cabot, Inc., at 1,955 feet on the No. 2 C. Groves farm; G. L. Cabot, Inc., at 1,658 feet on the Neva Husted farm; Sylvania Corp., at 1,325 feet on the No. 2 Hand farm; New York State Natural Gas Co., at 2,265 feet on the Park estate farm, and New Penn Development Corp., at 2,152 feet on the M. K. Husted farm. In addition to these tests, Clancy and others are shut down on the R. Towsley farm.

In other Steuben County operations, New York State Natural Gas Co. is drilling at 4,100 feet on the C. D. Carr farm wildcat in West Union Township and Wittmer and others are drilling at 2,205 feet on the George Caffrey farm in Greenwood Township.

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By GEORGE WEBER

Magnolia Pool Now a Surety; Shuler Allowable Cut Again

SHREVEPORT, La., Apr. 11.—The staking of numerous new locations in important field and wildcat areas and plans for deeper drilling of some formerly abandoned wildcat tests this week, point to increased activity for the Tri-State area. Completion of two South Arkansas wells in the past week also attracted considerable interest and contribute to greater development in the near future. The Columbia County, Arkansas, field near Magnolia was brought into production by the completion of Kerr-Lynn Oil Co., wildcat, and the Buckner field of the same county received its first extension in the completion of the Standard Oil Co. No. 1 Crone.

Deep tests in three fields, Shongaloo in Webster Parish and Sugar Creek in Claiborne Parish, Louisiana, and Jefferson in Marion County, Texas, were also objects of attention. Well completions in Arkansas and the Eastern Border of Texas are on the increase, due mainly to activity in the Shuler and Jefferson-Lodi fields.

Marion County, Rodessa

The most active field in the Rodessa area in the past week was the Jefferson-Lodi district in Marion County, Texas. During the week six new oil wells were brought in, and one southwest outpost well gained new attention.

Arkansas Louisiana Gas Co. No. 1 Howare, in the Gillespie Survey was completed for an initial production of 17 barrels per hour through a ¼-inch choke. Tubing pressure was 125 pounds and casing pressure, 825 pounds. Total depth was 6,030 feet. The well, located in the southwest part of the field, where the Henderson and Gloyd pays are tighter, was acidized with 1,500 gallons.

Dunn & Fisher brought in No. 1 Whitfield, in the Bennington Survey, making 457 barrels per day through a ¼-inch choke, with tubing pressure of 600 pounds and casing pressure of 1,130 pounds. Total depth was 6,085 feet.

Heyser Heard & Clardy No. 2-B Henderson, in the Ewing Survey made an initial gauge of 21 barrels per hour through a ¼-inch choke. Tubing pressure was 500 pounds, and casing pressure 200 pounds. Total depth is 6,065 feet.

Phillips Petroleum Co. No. 1 Henderson, in the Gillespie Survey gauged 363 barrels per day through a ¼-inch choke, with tubing pressure 350 pounds, and casing pressure 1,425 pounds. Total depth was 6,075 feet.

J. C. Robbins No. 1 J. & N. W. Ry., on the right-of-way in the Bennington Survey came in making 25 barrels per hour through a ¼-inch choke, with tubing pressure of 450 pounds and casing pressure of 600 pounds, and was making production tests at latest reports.

Union Producing Co. No. 6 Hutchinson, in the Coy Survey, total depth 6,107 feet, made 710 barrels per day on a 24/64-inch choke with tubing pressure 300 pounds and casing pressure 925 pounds.

In Cass County, a test in an outpost position to the Rodessa producing area, Chamblee's No. 1 White & Walker in the Potter Survey was abandoned at 6,201 feet. The wildcat tested two joints of mud in 23 minutes at 6,121-54 feet. Henderson sand was found at 6,011-23 feet and the Gloyd section at 6,024-27 feet.

Rodessa Outposts

In Marion County, Texas, southwest of production in the Jefferson area, Arkansas Louisiana Gas Co. No. 1 Pitts is reported to have cored the top of the Travis Peak just below 6,800 feet. Definite figures were not available. The varicolored lime was topped at 6,125 feet, and the Dees section of the Lower Glen Rose, at 6,145 feet. Interest in this test hinges on the showings of gas and distillate found in the Hill sand, which does not produce southwest of the East Texas border area of Rodessa in Cass County. The Gloyd also showed oil, at a point below the established water table in the Jefferson field proper.

At the other extreme of the Rodessa field, in Miller County, Arkansas, an outpost north of present production showed indications of making a small producer. Texas Canadian Oil Corp. No. 2 Thomas, NE corner, NW SE section 12-20-28, was last reported swabbing 20 barrels per day of oil, with no salt water and very little gas. The casing was reperforated at 6,108-32 feet, in the top of the Gloyd section.

The allowable production of the Jefferson-Lodi area of Marion County will shortly exceed that of the Cass County portion of Rodessa, it was revealed early in the week. The Texas Railroad Commission set the total output of Jefferson-Lodi at 6,686 barrels daily for April, as contrasted with 6,797 barrels for the Cass County section of the field.

Estimated Daily Production

Estimated daily gross production all companies week ending April 9 (figures in barrels):

NORTH LOUISIANA	
Bellevue	700
Caddo light	3,730
Caddo heavy	2,400
Converse	580
Cotton Valley heavy	80
Cotton Valley light	*8,020
De Soto and Red River	1,460
Elm Grove	320
Haynesville	2,930
Holly	85
Homer	2,555
Lisbon	10,030
Pleasant Hill	100
Rodessa	41,725
Sarepta-Carterville	190
Sligo	130
Sugar Creek	300
Urania	2,865
Zwolle	975
Total	79,175
SOUTH ARKANSAS	
Buckner	580
Champagnolle	1,200
El Dorado	1,860
Lisbon	265
Miller County	400
Nevada	670
Rodessa	7,335
Shuler	19,880
Smackover light	2,045
Smackover heavy	15,875
Stephens	540
Troy	1,270
Urbana	1,230
Village	†340
Total	53,490

Texas side of Rodessa field, 38,690 bbls. daily.
*3,685 bbls. is distillate.
†Village is located in Columbia County, Arkansas; one well, Kerr-Lynn Oil Co. No. 1 Barnett, sec. 14-17s-20w; gravity of oil, 38 degrees.

Sligo Completion

The Sligo field of Bossier Parish, Louisiana, gained another good producer late in the week, with the completion of Union Producing Co. No. 2-C Skannel, NE corner, section 13-17-12. The well gauged 539 barrels of oil in nine hours through a ½-inch choke, after acidizing. Total depth is 3,121 feet. The operators are beginning another test.

In Caddo Parish, the Blanchard test, completed as a gasser last week, A. O. Olson No. 1 Sharp, gauged 38 barrels of 54 gravity light oil per day. The test is producing from the Travis Peak at 5,994-6,002 feet.

Deep Test

In the Sugar Creek field, Claiborne Parish, Union-Standard No. 2 Brownfield, section 5-19-5 was last reported drilling at 10,160 feet, but the formation in which it was drilling was not ascertained.

The Lisbon field of Claiborne Parish gained a mile southwest extension during the week, through the completion of W. H. North No. 1 Patton Estate, C SW NE section 11-20-5. The new well gauged 14 barrels per hour on a 14/64-inch choke, with a tubing pressure of 100 pounds. Tubing was set on a packer. Saturated lime was cored at 5,326-32, 5,333-37 and 5,342-45 feet, and total depth is 5,347 feet. G. H. Vaughn No. 1-A Eppinger, C SW NE section 30-21-4, gauged 48 barrels per hour through a 1-inch choke. Total depth is 5,144 feet.

In Lincoln Parish, Lyons & Neely have rigged up No. 1 Brazell, a 1½-mile southeast outpost well to Lisbon. Due to the increased amount of interest in Lisbon, and the drilling of outposts on various edges of the two-parish field, development is expected to show upward trend over the next few weeks.

Shongaloo Test

Magnolia Petroleum Co. No. 1 Sexton Unit, located in the SW corner of NW SE section 32-23-9, in the old Shongaloo gas field of Webster Parish, continued to attract considerable attention during the week. The deep test cored sand at 8,899-8,906 feet, which showed an odor of gas. A distillate odor was also reported at 9,007 feet. Operators have announced plans to deepen to the Smackover lime which is the newly adopted name in that area for the Big lime.

In the Cotton Valley field of Webster Parish Hunt Oil Co. No. 8 Davis, section 23-21-10, made 50 barrels per hour on a ½-inch choke with tubing pressure of 475 pounds and casing pressure 1,200 pounds. Holloway sand was cored at 5,560-74 feet, and the total depth is 5,958 feet.

The Hunt Oil Co.'s No. 19 Hope, section 24-21-10, gauged 53 barrels per day on a ½-inch choke with tubing pressure of 650 pounds and casing pressure of 850 pounds. The Second Holloway sand was cored at 5,824-32 feet.

The North American Oil Consolidated Co. No. 1 Stewart, section 32-27-10 made a Bodcaw producer, gauging 840 barrels per day of distillate on a ½-inch choke, with casing pressure of 2,800 pounds and tubing pressure of 2,250 pounds. Total depth is 8,469 feet. The well made an estimated 10,000,000 feet of gas.

The A. G. Oliphant No. 3 Banks, in section 34-21-10, cored what is termed the "Second" Holloway sand at 5,973-89 feet, but it tested dry and the test is coring for the deep Bodcaw.

Kerr-Lynn Completion

The long-awaited completion of Kerr-Lynn Oil Co.'s No. 1 Barnett discovery well of a new field east of Magnolia in Columbia County, Arkansas, came about in the past week. The test flowed into tanks at the rate of 14.2 barrels for 20 hours, through a ¼-inch choke, with tubing pressure 315 pounds. During the first 24-hour period it gauged 302 barrels, 10 per cent salt water. The second 24-hour gauge was 309 barrels, still 10 per cent salt water. Gas produced with the 37.8 gravity oil is 974,000 feet per day, giving it a gas-oil ratio of 292 feet per barrel of oil. Total depth is 7,740 feet. No new locations have yet been announced, but are expected shortly.

Buckner Extended

A second completion in Columbia County attracted attention to the Smackover lime development of South Arkansas. Standard Oil Co. of Louisiana No. 1 Crone, section 8-16-22, came in making 58 barrels per hour through a ½-inch choke. Tubing pressure was 150 pounds. The well was treated with 5,000 gallons of acid, and is producing with a gas-oil ratio of 278 feet

(Continued on Page 219)

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Among Gulf Coast Drilling Contractors

Cron & Gracey have started drilling their No. 1 E. M. Fedder in the Dickinson field, Galveston County; have spudded Shell Petroleum Corp. No. 2 McFaddin, in the recently opened Clam Lake field in Jefferson County, and report six other operations as follows: One at Lake Long for Fohs Oil Co.; one in the Gibson field for Shell Petroleum Corp.; one in the Orange field and one in the Tomball field for Shell and one in the Hardin field for Fohs Oil Co., and one in Burleson County for Red Bank Oil Co.

George Echols has started his second test in the Jefferson sector of the Rodessa field, and one rig running for Sinclair Prairie Oil Co. and two for himself at the Heyser field in Victoria and Calhoun counties.

Harry L. Edwards Drilling Co. is preparing to complete his second well in the East Telferner field in Victoria County. The hole is bottomed at 5,182 feet and 5½-inch casing has been cemented at 5,130 feet. A production test is being made in the Dickinson field on Mid-States No. 1 Weems, bottomed at 9,152 feet, while at the Sandy Point field, J. A. Fite No. 1 fee is nearing the sand.

Smith & McDannald have moved a third rotary into the Dickinson field for Pure Oil Co. and are preparing to spud No. 1 Britton in the Five Corners field for themselves. Pan American Production Co. No. 1 Richers, in the Bay City field, Matagorda County, has been completed and the rig is waiting on location. In the Port Barre field, St. Landry Parish, No. 6 Cormier has been spudded for the Pan American Production Co. Other operations are reported at the Hastings and Long Lake fields for Stanolind Oil & Gas Co. and Tide Water Associated Oil Co.

Glenn H. McCarthy has spudded a projected 10,000-foot test in the Katy area for Stanolind Oil & Gas Co. It is No. 1 W. E. Freeman in Survey 98. All wells in the field have produced gas from the Saline Bayou formation, but the present test will be carried to the Wilcox formation. Other operations are for himself in the Benavides field, Duval County, and at the West Beaumont field in Jefferson County.

Jack Frazier is moving in a large rotary from the Hardin field in Liberty County to the Aldine area, in Harris County, where No. 1 Gillespie will be drilled to the Upper Saline Bayou formation. Two distillate wells have been completed in this area. His No. 1 Varner Realty Co., 750 feet south of his recently completed Vollmer-Neiman, is drilling below 5,900 feet.

Nicklos Drilling Co. is below 8,830 feet in Continental Oil Co. No. 1 Vidrine at the Villa Platte field in Evangeline Parish. Two rotaries are waiting on locations. In the Valentine field, two rotaries are running for the Pan American Production Co.

Payne Drilling Co. is preparing to make a production test of O. W. Killam No. 1 J. J. Sweeney Estate, at the old Ogburn Prospect, northwestern Harrison County. The hole is bottomed at 6,739 feet and 5½-inch casing is set at 6,634 feet. Sand with an oil odor was logged last week in the Upper Cockfield sand at approximately 6,500 feet.

Housh, Schofield & Thompson have spudded two wells in the Fairbanks field for the Mortex Oil & Gas Co.

Archie McCoy, driller, and J. V. Rowan of Rowan & Hope, contractors of San Antonio, taken on the derrick floor of their rig that was recently used in drilling for the Mexican government in the Poza Rica, Mexico, field

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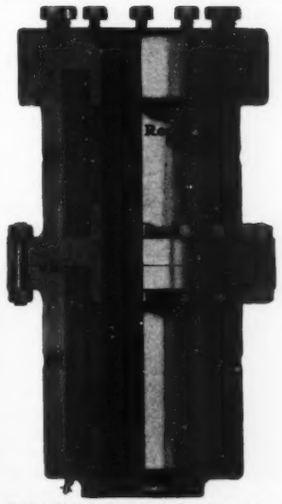

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Rocky Mountain Area

By
T. R. INGRAM

Eastern Colorado Continues to Attract Major Companies

DENVER, Colo., April 11.—Interest in eastern Colorado was revived with the announcement that the Continental Oil Co. is preparing to move in for a test on the Cottonwood structure in Prowers County. Stanolind Oil & Gas Co. takes two more blocks in that area. The Gulf Oil Corp. test in Cheyenne County is resuming with rotary tools.

Wyoming supreme court affirms right of legislature to have state royalty income investigated on a commission basis. Ohio Oil Co. No. 14 Harrison & Cooper, in the Rock River field, made 778 bbls. naturally from the Sundance. Sinclair-Wyoming Oil Co. No. 12 Wertz, Carbon County, made 594 bbls. in 19 hours from the Tensleep. Italo Petroleum Corp. No. 1 Tunney-Bragg, on Shirley dome, was dry and abandoned. Platte County is to have a test near Wheatland. Operations in the Baxter Basin area are attracting considerable attention. One small well was completed in Osage.

Glacier Production Co. No. 1 McNamar Unit, north of the Cut Bank gas field in Montana, was completed for 17,000,000 feet and means an extension of the gas pool or discovery of new pool. Superior Oil Co. No. 7-A Government, west side of Kevin-Sunburst, swabbed 160 bbls. first 24 hours, sweet oil from the Sunburst.

NEW MEXICO

Field activity in southeastern New Mexico the past week was featured by two new tests, a completion and two near completions in the Vacuum area, a westward extension of the south end of the Monument field, and completion of an edge well in the South Eunice sector, all in Lea County. One completion was recorded in Eddy County.

The new tests in the Vacuum district are Magnolia Petroleum Co. No. 6 State-Bridges, C SW NW section 36-17-34, and Texas Co. No. 2 State, C SE NE section 36-17-34.

Magnolia Petroleum Co. No. 1-J State, section 22-17-34, one-half mile west of several producers linking the north and south sectors of the Vacuum pool, was bottomed at 4,750 feet and flowed 25 bbls. of oil an hour after acidizing, but was not a completion. It probably will be reacidized. The other near-completion at Vacuum was Amerada Petroleum Corp. No. 1-VA State, section 23-17-34, which had natural production of 426 bbls. of oil daily through tubing choke at total depth of 4,740 feet.

Completions of the week in Lea County follow:

Magnolia Petroleum Co. No. 1-K State, C NW SE section 31-17-35, Vacuum area, topped pay at 4,346 feet, total depth 4,667 feet, and flowed 484 bbls. of oil in 11 hours. Gas was estimated at 750,000 feet.

Two States Oil Co. No. 1 Etcheverry, SE SW NE section 10-20-36, extended the Monument pool about one-fourth mile southwest. It had pay at 3,880-90 feet, total depth 3,894 feet, and had initial production of 15 bbls. of oil an hour after acidizing.

Texas Pacific Coal and Oil Co. No. 9-A State, NW SW NE section 7-22-36, southwest edge test in the South Eunice area, had initial flow of 10 bbls. of oil an hour from pay found at 3,750 feet, total depth 3,825 feet. Production was through choke on tubing. Gas averaged 2,000,000 feet.

Sindorf and others No. 1 Glier, NE cor. section 33-22-37, Skelly district, found pay at 3,550-60 feet, was bottomed at 3,674 feet, and flowed 125 bbls. of 38.5-gravity oil daily.

Humble Oil & Refining Co. No. 2-H State, C SE SW section 27-22-37, flowed 192 bbls. of oil daily from pay topped at 3,460 feet, total depth 3,660 feet.

Stanolind Oil & Gas Co. No. 4-B Meyers, C SW NW section 21-24-37, found pay at 3,507 feet, total depth 3,682 feet, and flowed 46 bbls. of oil in four hours.

Skelly Oil Co. No. 1 Toby, C SW SW section 7-24-37, topped pay at 3,640 feet, was bottomed at 3,666 feet and had initial production of 384 bbls. of 42-gravity oil daily.

Texas Co. No. 3 Fristoe, NW SE NE section 3-25-37, Langlie pool, flowed 205 bbls. of oil in eight hours, initially. It found pay at 3,377 feet and was bottomed at 3,480 feet.

Culbertson & Irwin No. 1 Liberty Royalty, NE NW NW section 3-25-37, topped pay at 3,395 feet, total depth 3,396 feet, and flowed 102 bbls. of oil in 17 hours.

Anderson-Prichard Oil Corp. No. 1 Carlson, C SW NW section 21-25-37, an old well deepened to 3,020 feet, had initial flow of 65 bbls. of oil daily and was recompleted.

Continental Oil Co. No. 4-B-24 Reed, CE half NW SW section 24-20-36, Monument district, found pay at 3,810 feet, total depth 3,863 feet, and flowed 60 bbls. of oil in two hours, with 1,140,000 feet of gas.

Same company's No. 3-B-23 Reed, CE half SE SE section 23-20-36, flowed 165 bbls. of oil in three hours from pay found at 3,800 feet, total depth 3,866 feet. Gas gauged 1,930,000 feet.

Skelly Oil Co. No. 1-K State, NE NE NW section 32-21-37, Hardy area, had pay at 3,703 feet and was bottomed at 3,761 feet. It flowed 70 bbls. of oil a day naturally, was acidized and flowed 231 bbls. of oil daily. Gas volume was 1,500,000 feet.

In Eddy County, D. & B. Oil Co. No. 2 Jenkins, SW NW NW section 20-17-30, Jackson district, topped pay at 3,040 feet, total depth 3,265 feet, and swabbed 20 bbls. of oil daily.

Lea County

Amerada Pet. Corp. No. 6 Byrd, SE sec. 12-20-36. Loc.
Amerada Pet. Corp. No. 3 Laughlin, C NW NE sec. 9-20-37. T.D. 2,855 ft.; set 8-in. 2,573 ft.
Amerada Pet. Corp. No. 1 State VA, C SE SW sec. 23-17-34. T.D. 4,740 ft.; tstd. 397 B.O. in 19 hrs.
Amerada Pet. Corp. No. 1 State VB, C NE SW sec. 36-17-34. Drlg. 3,860 ft.
Amerada Pet. Corp. No. 1 Frances Stuart, NE SW NE sec. 22-25-37. Drk.
Anderson-Prichard Oil Corp. No. 2 Langlie, SE sec. 8-25-37. Drlg. 3,420 ft.
Anderson-Prichard Oil Corp. No. 4 Langlie, NE SW NE sec. 8-25-37. R.U.R.
Anderson-Prichard Oil Corp. No. 1 Wells, C SE SE sec. 5-27-37. Drlg. 3,610 ft.
Anderson-Prichard Oil Corp. No. 2 Wells, C SW SE sec. 5-25-37. Loc.
Bradley Oil Co. No. 1 Downes, SE NE SE sec. 5-22-37. Drlg. 3,454 ft.; 200 ft. O.I.H.
Cities Service Oil Co. No. 3-A Closson-A, C NE SE sec. 18-22-36. Drlg. 3,275 ft.
Cities Service Oil Co. No. 1-H State, C NE NE sec. 17-22-36. T.D. 3,884 ft.; prep. to deepen.
Continental Oil Co. No. 1-B-15 Britt, C W½ NW NW sec. 15-20-37. Loc.
Continental Oil Co. No. 2-A-20 Jack, C SE SE sec. 20-24-37. Cellar.
Continental Oil Co. No. 1-A-31 Marsh, SE sec. 31-20-39. Wildcat; T.D. 4,346 ft.; fsg.
Continental Oil Co. No. 4 Reed B-23, C E½ NW NE sec. 23-20-36. R.U.R.
Continental Oil Co. No. 4-E-17 State, C SW NW sec. 17-22-36. R.U.R.
Continental Oil Co. No. 1-F-1 State, C SW SW sec. 1-21-36. T.D. 3,935 ft.; to P.B.
Continental Oil Co. No. 1-G-12 State, C SE SW sec. 12-18-35. Drlg. 4,416 ft.
Continental Oil Co. No. 1-H-35 State, C SE NE sec. 35-17-34. Drlg. 4,389 ft.; set 5-in. csg.
Continental Oil Co. No. 1-I-16 State, C NW NW sec. 16-18-35. T.D. 1,755 ft.; set 9-in. csg.
Cranfill & Germany No. 1 Weir, C NE NE sec. 15-20-37. T.D. 4,210 ft.; S.D.O.
Culbertson & Irwin No. 3 Alston, NE cor. sec. 27-25-37. Drlg. 2,842 ft.
Culbertson & Irwin No. 6-A Humphrey, NE SW SE sec. 3-25-37. Drlg. 1,125 ft.
Danglade & Clower No. 1 Currie, NE NE SW sec. 6-21-37. T.D. 3,520 ft.
Danglade & Clower No. 1 Glier, C SW NE sec. 32-22-37. T.D. 3,680 ft.; C.O.; flows by hds.; pays 3,555-70 ft. and 3,620-80 ft.
L. E. Elliott No. 2 Elliott, NE NW SE sec. 26-20-36 Drlg. 1,610 ft.
A. R. Eppenauer No. 1 Stuart, NW NE NE sec. 22-25-37. T.D. 3,373 ft.; flwd. 15 B.O.P.H. at 3,321 ft.
J. E. Farrell No. 2-C Walden, C SE SW sec. 15-22-37. Drlg. 3,700 ft.
Geo. F. Getty, Inc., No. 2-F State, C NW NE sec. 36-17-34. Drlg. 3,580 ft.
Geo. F. Getty, Inc., No. 1 Riggs, NW sec. 1-26-36. Wildcat; T.D. 3,358 ft.; P.B. 3,346 ft.; flwd. est. 150 B.O. P.D.; C.O.; flwd. 45 B.O. in 14 hrs.
Gulf Oil Corp. No. 1 Alley, C NE SE sec. 10-23-37. Drlg. 3,300 ft.
Gulf Oil Corp. No. 7-F Bell, C SW NW sec. 36-20-36. Drlg. 2,810 ft.
Gulf Oil Corp. No. 1 Boyd, sec. 23-22-37. T.D. 3,681 ft.; tstg.
Gulf Oil Corp. No. 2-D Kutter, C SE SW sec. 8-19-37. T.D. 4,040 ft.; tstg.
Gulf Oil Corp. No. 4-C Kutter, C SW NW sec. 18-19-37. Drk.
Gulf Oil Corp. No. 1-D Mattern, SW sec. 6-22-37. T.D. 3,795 ft.; P.B. 3,775 ft.; C.O.
Gulf Oil Corp. No. 4 McCormack, C SW SE sec. 32-21-37. Drlg. 2,315 ft.
Gulf Oil Corp. No. 2 Ramsey, C SW SW sec. 27-21-36. T.D. 3,895 ft.; P.B. 3,871 ft.; to shoot.
Gulf Oil Corp. No. 1 J. Whitten, SE SE SW sec. 33-23-36. T.D. 2,998 ft.; S.D.
Humble O. & R. Co. No. 3-H State, C NW NW sec. 34-22-37. Loc.
Humble O. & R. Co. No. 3 Williams, C SW NW sec. 34-24-37. T.D. 3,532 ft.
Inter-Coast Pet. Co. and J. C. Clower No. 1 State, SW cor. sec. 2-23-37. Drlg. 2,812 ft.
Jal Nat. Gas Corp. No. 2 Justis, NE sec. 20-25-37. T.D. 3,029 ft.; tstg.
Carl B. King No. 1-A Stuart, NW NE NW sec. 14-25-37. T.D. 3,395 ft.; S.I.
Magnolia Pet. Co. No. 1 Brunson-Argo, C NW NE sec. 9-22-37. T.D. 1,396 ft.; R.U.S.T.
Magnolia Pet. Co. No. 1 State G, NW NW NE sec. 34-17-34. T.D. 4,905 ft.; P.B. 4,794 ft.
Magnolia Pet. Co. No. 2-K State, C NE SE sec. 31-17-35. Spd.
Magnolia Pet. Co. No. 1-J State, C NE SE sec. 22-17-34. T.D. 4,750 ft.; acd.
Magnolia Pet. Co. No. 2 State-Bridges, sec. 14-17-34. T.D. 4,593 ft.; flwd. 51 B.O. in 1 hr., naturally.
Magnolia Pet. Co. No. 3 State-Bridges, C NE NW sec. 26-17-34. Drlg. 2,220 ft.
Magnolia Pet. Co. No. 4 State-Bridges, C NW NE sec. 26-17-34. Drlg. 4,300 ft.
Magnolia Pet. Co. No. 5 State-Bridges, C NE NW sec. 26-17-34. Drlg. 4,035 ft.
Magnolia Pet. Co. No. 6 State-Bridges, C SW NW sec. 23-17-34. Loc.
Maljamar O. & G. Co. No. 9 Baish, C NW NW sec. 21-17-32. Loc.
Jas. A. Mascho No. 2 Cloyd, C SW SW sec. 20-22-33. Loc.
C. T. McLaughlin No. 1 Polhamus, NE sec. 9-24-37. T.D. 3,672 ft.; S.D.O.
National Drlg. & Prod. Co. No. 1 Flint, C NE NE sec. 29-20-34. Wildcat; drlg. 3,710 ft.
Ohio Oil Co. No. 1 Kutter D, C SW SW sec. 18-19-37. Drlg. 3,625 ft.
Ohio Oil Co. No. 7 State-McDonald, C SW SE sec. 16-22-36. T.D. 3,871 ft.; C.O.
Ohio Oil Co. No. 10 State-McDonald, C NE SW sec. 16-22-36. Drlg. 1,450 ft.
Ohio Oil Co. No. 1 State-Staplin, C SE SW sec. 30-17-35. Drlg. 4,065 ft.
Ohio Oil Co. No. 2 State-Warn, C NE SW sec. 31-17-35. Drk.
Parker Drlg. Co. No. 1 Irwin, C W½ SW SW sec. 35-24-37. Drlg. 3,390 ft.
Paton Bros. No. 2 Wilkinson, C SE SE sec. 8-18-31. Loc.
Lem Peters No. 1 May, C NW SE sec. 27-22-37. Cellar and pits.
Phillips Pet. Co. No. 2 New, CEL SE NE sec. 26-20-36. Drlg. 3,760 ft.
Phillips Pet. Co. No. 2 Santa Fe, C SW SE sec. 30-17-35. Drlg. 4,526 ft.
Phillips Pet. Co. No. 3 Santa Fe, C SW NW sec. 5-18-35. Rig.
Plains Prod. Co. No. 1 Huhmphreys, NE sec. 3-25-37. Loc.
Repollo Oil Co. No. 4 Moseley, SW SE NE sec. 34-24-37. Drlg. 3,300 ft.
Repollo Oil Co. No. 1 State, SE cor. sec. 6-17-34. T.D. 2,770 ft.; R.U.S.T.
Repollo Oil Co. No. 2-B State, NE SE NW sec. 7-22-36. R.U.R.
Repollo Oil Co. No. 3-B Whitten, NE SE NE sec. 4-24-36. T.D. 2,570 ft.; S.D.
Harry J. Schafer No. 1-A State, C E½ NW NE sec. 26-20-36. Drk.
Shasta Oil Co. No. 2 Woolworth, NE NW NW sec. 28-24-37. T.D. 3,015 ft.; fsg.
Shell Pet. Corp. No. 1-A State, NE cor. sec. 33-18-36. Drlg. 5,077 ft.
Shell Pet. Corp. No. 1-A State, C NW NE sec. 31-17-35. Drlg. 4,650 ft.
Shell Pet. Corp. No. 2-A State, C SW NE sec. 31-17-35. Drlg. 1,610 ft.
Shell Pet. Corp. No. 4-E State, C SW NW sec. 12-20-36. Drlg. 3,800 ft.
Skelly Oil Co. No. 5 J. B. Baker, C SE NW sec. 27-22-37. T.D. 3,620 ft.; tstg.
Skelly Oil Co. No. 3 G. W. Sims, C NW NE sec. 9-23-37. T.D. 3,642 ft.; C.O.
Skelly Oil Co. No. 1-C R. R. Sims, sec. 3-23-37. Drlg. 3,688 ft.
Skelly Oil Co. No. 1-E W. P. Sims, C NW NE sec. 10-23-37. T.D. 3,625 ft.; flwd. 452 bbls. in 24 hrs.
Southern Pet. Explo. Co. No. 2 Downes, C SW SW sec. 32-21-37. R.U.R.
Stanolind O. & G. Co. No. 14-A Gilluly, C SW NW sec. 24-20-36. T.D. 2,564 ft.; set 9⅝-in. csg. 2,543 ft.
Stanolind O. & G. Co. No. 2-A Hill, C NE SE sec. 6-21-37. Loc.
Stanolind O. & G. Co. No. 3-C Hill, C NW NW sec. 5-21-37. Drlg. 2,955 ft.

Stanolind O. & G. Co. No. 5-B Myers, C NE SW sec. 9-24-37. Loc.
W. H. Street No. 4 Woods, C NE NE sec. 22-22-37. Drlg. 698 ft.
Texas Co. No. 3 Black, C NW NE sec. 21-24-37. Loc.
Texas Co. No. 1 Corbin, C NW SW sec. 19-18-33. Drlg. 4,913 ft.
Texas Co. No. 4 Fristoe, NW NE SE sec. 3-25-37. Cellar and pits.
Texas Co. No. 1-N State, C SW SW sec. 30-17-35. T.D. 1,580 ft.; set 7⅝-in. 1,574 ft.
Texas Co. No. 1-O State, C NW SW sec. 36-17-34. Drlg. 3,350 ft.
Texas Co. No. 2-O State, C SE NE sec. 36-17-34. Cellar, pits.
Texas Co. No. 1-P State, C NW SE sec. 7-18-35. Loc.
Texas Pacific C. & O. Co. No. 10-A State, Acct. 2, C W½ SW SW sec. 8-22-36. Drlg. 2,502 ft.
Texas Pacific C. & O. Co. No. 11-A State, Acct. 2, C SE NE sec. 7-22-36. T.D. 234 ft.; rmg.
Ted Weiner No. 1 Smith, NE cor. sec. 4-25-37. Drlg. 420 ft.
Weiner No. 1 Parcell, C SW NE sec. 8-23-28. T.D. 221 ft.; R.U.S.T.
Western Gas Co. No. 1 Curry, C SE SE sec. 1-24-36. T.D. 175 ft.; R.U.R.
Western Gas Co. No. 1 Matkins, C SE SE sec. 15-23-36. Drlg. 2,840 ft.

Eddy County

F. E. Baker No. 1 Eddy, NE sec. 12-22-27. T.D. 2,117 ft.; S.D.O.
Barnett Oil Dev. Co. No. 1 King Permit, C NW SE sec. 23-26-30. T.D. 980 ft.; S.D.
Carper Drlg. Co. No. 3 Gissler, C E½ E½ NW sec. 23-17-30. Drlg. 2,860 ft.
Danciger O. & R. Co. No. 4-A Turner, C SW SW sec. 18-17-31. T.D. 1,960 ft.; S.D.
Danciger O. & R. Co. No. 1-B Turner, CEL NE SE sec. 17-17-31. Loc.
D. & B. Oil Co. No. 3 Jenkins, NE NE NW sec. 20-17-30. R.U.M.
Emperor Oil Co. No. 4 Puckett, C NE NE sec. 24-17-31. Drlg. 3,783 ft.; 2,000 ft. O.I.H.
Emperor Oil Co. No. 5 Puckett, C SW NE sec. 24-17-31. Drlg. 3,668 ft.; swb. 30 B.O.P.D.; 2,500 ft. O.I.H. in 20 hrs.
Finley & Cherry No. 1 Buchley, C NW NW sec. 28-16-31. Wildcat; T.D. 3,750 ft.; S.D.
Flint Prod. Co. No. 1-B State, SE sec. 20-17-30. Drlg. 3,830 ft.
C. J. Frederick No. 1 Reed, C NE SW sec. 28-24-28. Drlg. 2,015 ft.
F. W. & Y. Oil Co. No. 8-A Gissler, NE NW NE sec. 23-17-30. T.D. 3,237 ft.; fsg.
F. W. & Y. Oil Co. No. 9-A Gissler, C SE NE sec. 14-17-30. Drlg. L. 3,110 ft.
F. W. & Y. Oil Co. No. 1-B Gissler, SW sec. 14-17-30. Drlg. L. 3,430 ft.; 2,500 ft. O.I.H. in 4 hrs.
F. W. & Y. Oil Co. No. 2-B Gissler, C NW NW sec. 24-17-30. C.O. 3,495 ft.; swb. and flwd. 120 B.O.P.D.
F. W. & Y. Oil Co. No. 3 Jackson, C NW SE sec. 13-17-30. T.D. 2,953 ft.; fsg.
Grayburg Oil Co. No. 11 Burch, NE NE SE sec. 19-17-30. Drlg. 3,215 ft.; 1,000 ft. O.I.H.; cmt.
Grayburg Oil Co. No. 4 Keely, SE SW NE sec. 24-17-9. T.D. 3,588 ft.; to test.
H. A. Hartwell No. 1 Vandagrift, NE NE SE sec. 8-18-27. T.D. 2,000 ft.; S.D.O.
R. L. Holcomb No. 1 State, NW sec. 22-17-28. T.D. 1,980 ft.; L.; bailing 15 B.O.P.D.
C. F. Ingram No. 1 Page, NE NE SW sec. 15-21-28. T.D. 1,495 ft.; S.D. for new rig.
B. M. Koehane et al No. 1 Shannon, SE cor. sec. 27-16-31. Drlg. L. 3,750 ft.
Paul Moran No. 1 Crawford & Smith, NW NW SW sec. 24-24-26. Drlg. 995 ft.; set csg.
Murchison & Closuit No. 1 Foster, SE NE SE sec. 17-17-31. Drlg. 2,850 ft.
Murchison & Closuit No. 2-A State, NW SE SW sec. 16-17-31. Drlg. 3,861 ft.; cmt. 7-in.
Pecos Valley Gas Co. No. 1 Sappenfield, C SE SE sec. 4-16-28. Drlg. 2,165 ft.
Premier Pet. Co. No. 1 Beeson, NE SE SE sec. 28-17-30. Drlg. 2,645 ft.
Red Gulch Oil Co. No. 2 Keyes, C SW SE sec. 4-17-28. Drlg. 1,052 ft.; S.O.&G.
Repollo Oil Co. No. 2-C McIntyre, NE cor. sec. 20-17-30. Drlg. 2,450 ft.
Repollo Oil Co. No. 4-D McIntyre, NW NE NE sec. 21-17-30. T.D. 3,265 ft.; flwd. 200 B.P.D.; acd.; flwd. 14 B.O.P.D.; tstg.
Repollo Oil Co. No. 2-A Parke, NW NW NE sec. 22-17-30. Drlg. 3,015 ft.
Repollo Oil Co. No. 1-B Parke, SW cor. sec. 15-17-30. T.D. 3,270 ft.; swb. 36 B.O.P.D.; to acd.
Paul Sarget No. 1 State, NE sec. 16-17-31. T.D. 3,749 ft.; P.B. 3,745 ft.; tstg.
R. A. Shugart No. 1 Coulthard, C NW SW sec. 35-18-31. C.O. 3,500 ft.; flwd. 85 B.O.P.D.; tstg.
W. K. Royalty No. 2 State, C NW NE sec. 16-17-31. T.D. 3,319 ft.; 1,700 ft. O.I.H. in 7 hrs.
W. O. Snyder No. 1 Pecos Irrigation, C NE SE sec. 15-25-28. T.D. 3,330 ft.; fsg.
Western Drlg. Co. No. 1-A Western, SE SW NW sec. 23-17-29. Drlg. 885 ft.
Neil Wills No. 2-A State, CEL SE NE sec. 19-20-30. Drlg. L. 1,583 ft.

Chaves County

E. J. Fisher No. 1 Etz Permit, NE sec. 23-7s-26. Drlg. L. 1,580 ft.; S.O.
Grastorf & Caudill No. 1 Smith, C NE NE sec. 1-4s-29. Wildcat; T.D. 680 ft.; S.D.O.
Interstate Minerals, Inc., No. 1 Dunigan, NW cor. sec. 15-15-30. Loc.
J. & L. Drlg. Co. No. 2 Hurd, SW sec. 11-11-26. Drlg. L. 980 ft.; p. 21 B.O.P.D. while drlg.

De Baca County

Land Owners Oil Co. No. 1 McAdoo, SW cor. sec. 16-1s-7e. O.W.; prep. to deepen from 5,850 ft.; S.D.
James D. Ward No. 1 Summers, NW NE SW sec. 17-4n-20. T.D. 260 ft.; S.D.
N. F. Woods No. 1 Jones, C NE SW sec. 17-4n-20. T.D. 25 ft.; S.D.

Dona Ana County

Jules C. Bertrand No. 1 Casad Permit, sec. 24-26-5e. T.D. 47 ft.; S.D.O.

McKinley County

S. Dysart No. 1 Govt., NE sec. 14-14-10w. T.D. 1,390 ft.; fsg.

Otero County

Fred Turner, Jr., No. 1 Ella Everett, C SE SE sec. 34-22-13. Drlg. 3,000 ft.
Fred Turner, Jr., No. 1 H. V. Everett, SE SE sec. 28-22-13. Drlg. 1,700 ft.

Roosevelt County

C. S. Peterson and Conquistadores Oil Co. No. 1 Good, NW SE SE sec. 28-5s-30. T.D. 623 ft.; S.D. for csg.

NORTHWEST NEW MEXICO

McKinley County

Claude Walker No. 6 fee, SE SW SE sec. 20-20n-9w, Drlg. 350 ft.

San Juan County

The Continental Oil Co. No. 73 Rattlesnake, C NW SE section 2-29n-19w, Rattlesnake pool, was completed in the Dakota at 709 feet for 42 bbls. per day, no water.

Continental Oil Co. No. 74 Rattlesnake, CEL SE NE sec. 2-29n-19w. R.O.G. (first report).
Frank Lischke No. 1 Abreo, SW SW sec. 27-30n-11w. Drlg. 400 ft. (formerly Calif. Synd.)
Anna Oil Corp. No. 6 Govt., SW NE NE sec. 33-30n-11w. Drlg. below 1,900 ft. in sh.

Socorro County

Central New Mex. Oil Co. No. 1 Belen Ld. Grant, NW sec. 16-3n-1e. T.D. 2,700 ft.; R.U. additional power.

Torrance County

Chief O. & G. Co. No. 1 Pace, SE sec. 12-6n-7e. T.D. 2,020 ft.; fsg.

Valencia County

Old Spanish Grants, Inc. No. 1 San Clemente, C SE SW sec. 23-7n-1e. Contr. to Wm. Hix to drill for acreage spread. M.I. rot. (first report).
C. A. Grober, et al No. 1 Fuqua, NE NE sec 19-5n-3e. T.D. 900 ft.; bldg. steel dk. for rot.

COLORADO

Archuleta County

Pagosa Oil & Dev. Co. No. 1 Macht, S sec. 32-36n-1w. Set 10-in. at 675 ft.; drlg. ahead.

Cheyenne County

After acidizing, bailing down and testing the horizon at 4,808-15 feet and finding a non-commercial show of oil, the Gulf Oil Corp. No. 1 Union Pacific-Larsen is preparing to resume drilling with rotary tools. It is still 1,500 to 1,800 feet above its original objective.

Gulf Oil Corp. No. 1 Union Pacific-Larsen, C SE NW sec. 13-13s-49w. T.D. 4,895 ft.; R.U.R. to resume.

Fremont County

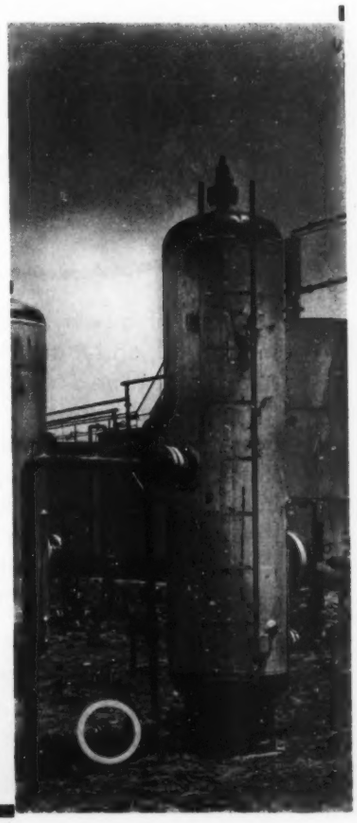
Isadore Spangler No. 1 St. Mary's, SE SE SE sec. 2-19s-70w. Drlg. 1,050 ft.

SHEAR-RELIEF VALVES

Provide Safe Protection For High Pressure

FLOW-LINE SYSTEMS

Note (left) SHEAR-RELIEF Valve near well location, (right) near separator input, and (above right) close-up of SHEAR-RELIEF Valve.



The well known SHEAR-RELIEF Valve protection for pumps is equally effective on flow-line systems, as pictured here. Where well pressure is abnormally high the valve is placed in the flow-line (near well output, and near separator) and set to shear at slightly above flowing pressure. Production is through a series of chokes, reducing the well pressure to the desired flow-line pressure. Should the chokes cut out, or should the separator freeze up, the well pressure can build up on the flow-line only to the set point of the SHEAR-RELIEF Valve, when the nail shears and relieves excess pressure.

There is no oil or gas leak around the SHEAR-RELIEF Valve stem either before or after it opens to relieve flow-line pressure. The SHEAR-RELIEF Valve is protected against freezing when it opens, by placing a choke in the discharge line.

FLUID-PISTON CLUTCH PUMPS
ABERCROMBIE PUMP CO.
GULF BLDG. HOUSTON TEX.

Kiowa County

Stanolind Oil & Gas Co. is reported to have taken over a block of approximately 7,000 acres in eastern Kiowa County, on the Colorado side and in Greeley County, in western Kansas. The acreage was assembled by Waldo E. Rennie, of Denver, according to these reports. The acreage in Kiowa County is in Township 20s, Ranges 41 and 42w, and the Greeley County in 20s-43w. Stanolind already has a block of around 15,000 acres to the north in Townships 18 and 19s, Ranges 41 and 42w, which was acquired after a seismograph survey. There are seven blocks in this county held by major companies which have not been tested. Three other blocks have been drilled.

LaPlata County

N. Spatler No. 1 Bryce, SE SW SW sec. 31-33n-9w. Drlg. below 1,510 ft., after sdtrgk. tools.

Prowers County

Prowers County, in the southeastern corner of the state, will be the next area in eastern Colorado to receive attention from the wildcatters. The Continental Oil Co. is ready to begin moving in for its test on the Cottonwood Structure in the north central part of the county in Townships 21 and 22s, Ranges 44 and 45w. It expects to begin spudding not later than May 1. The area has definite surface structure and has been surveyed in detail with seismograph and core drilled. Company geologists are now checking the several surveys before making the final location, which will be released next week.

Stanolind Oil & Gas Co. was reported this week to have entered this area and to have acquired a block of around 8,000 acres to the southeast of the Cottonwood block on the line between Prowers County and Hamilton County, Kansas. This block, which was reported assembled by Waldo E. Rennie, of Denver, lies in Township 23s, Range 41w, in Prowers County, and in 23s-43w, in Hamilton County.

The California Co. also is reported placing leases on record in Township 23s, Range 42w, to the west of the Stanolind block, where it has quite a sizable block. Gulf Oil Corp. has 18,000 acres on the Chivington block, adjoining the Cottonwood block on the northwest, and the Indian Territory company has 8,000 acres in the May Valley block to the west of Cottonwood.

The Continental has around 18,000 acres on the Cottonwood block, with the Magnolia, California, Gulf and Indian Territory companies holding some acreage.

WYOMING

The Wyoming state supreme court has affirmed a decision of a lower court in upholding the right of the state to engage a special investigator on a commission basis to investigate royalty payments on state-owned land. The legislature in 1937 authorized the audit on the basis of 25 per cent of any amounts recovered in a proper accounting of amounts due to the state and contract was given to W. Jack Cole. The contract was attacked in a suit against Cole, the attorney general and the governor. It was upheld in the lower court and sustained upon appeal to the higher court. The suit was based on the ground that under the constitution the state school fund could not be reduced by the payment of a commission. The state receives royalties from Salt Creek, Grass Creek, Baxter Basin and Medicine Bow areas.

Big Horn County

Prescott & Mileski No. 1 Govt., NE NW SW sec. 1-51n-93w. Drlg. 420 ft.
Clifford S. Johnson No. 1 Johnson, CEL NW NW sec. 24-51n-93w. Drlg. 219 ft.
Joan Oil Co. No. 1 Howell, NE NW NE sec. 32-55n-97w. Drlg. 2,340 ft.

Carbon County

Ohio Oil Co. has a good Sundance sand completion in the Rock River field in its No. 14 Harrison & Cooper, SE NW SW section 35-20n-78w, an inside well on the east side. It flowed 778 bbls. first 24 hours through the 6⅝-inch casing at a total depth of 3,130 feet. The casing was set on top of the sand at 3,065 feet.

Sinclair-Wyoming Oil Co. No. 12-B Wertz, SE NW NW section 7-26n-89w, in the Wertz field, made 594 bbls. in 19 hours at 5,770 feet, total depth, from the Tensleep topped at 5,747. The 7-inch was cemented at 5,739 feet. It made considerable water at first, but this apparently was coming from behind the pipe and not from the bottom of the hole. It is between No. 10 Wertz, the discovery in the Tensleep, which averaged 75 bbls. an hour on a 5-day test, and No. 11 Wertz, which made 410 bbls. per day on final test.

Italo Petroleum Corp. No. 1 Tunney-Bragg, NE SE NW section 11-26n-81w, a test on the Shirley dome, was dry and abandoned at 2,005 feet in the red beds. It had water in the Muddy at 1,185-1,220 feet. Sand at 1,249-52 feet and Dakota (?) at 1,276-1,310 feet were dry. Top of red beds was at 1,705 feet.

Wyco Oil Co., Inc., No. 1 Union Pacific, NE SE NE sec. 3-23n-79w. Rdy. to spd.
Ohio Oil Co. No. 3 Hazlett Est., NE SW SE sec. 34-23n-79w. R.U.R.
Ohio Oil Co.-California Co., No. 3 State-Griffin, C SW NW sec. 36-21n-79w. R.U.R.

Fremont County

Sinclair-Wyoming Oil Co. No. 2-B Muskrat, NW NW NE sec. 4-33-92w. Cmtd. 7-in. at 5,434 ft.; perf. pipe and tstg. Frontier by stages.
Stanolind O. & G. Co. No. 1 Govt., C SE SE sec. 3-33n-96w. Cg. in lower Morrison at 8,463 ft.
Consolidated Oil Properties No. 3 Ewart, C SW SE sec. 16-1n-14w. T.D. 700 ft.; rng. form. test.
Ben Stewart No. 1 Darnell, NE SE sec. 26-3n-1w. Drlg. 914 ft.

Lincoln County

H. C. Harris et al No. 1 Govt., SE NW NW sec. 23 21n-117w. Drlg. 200 ft.

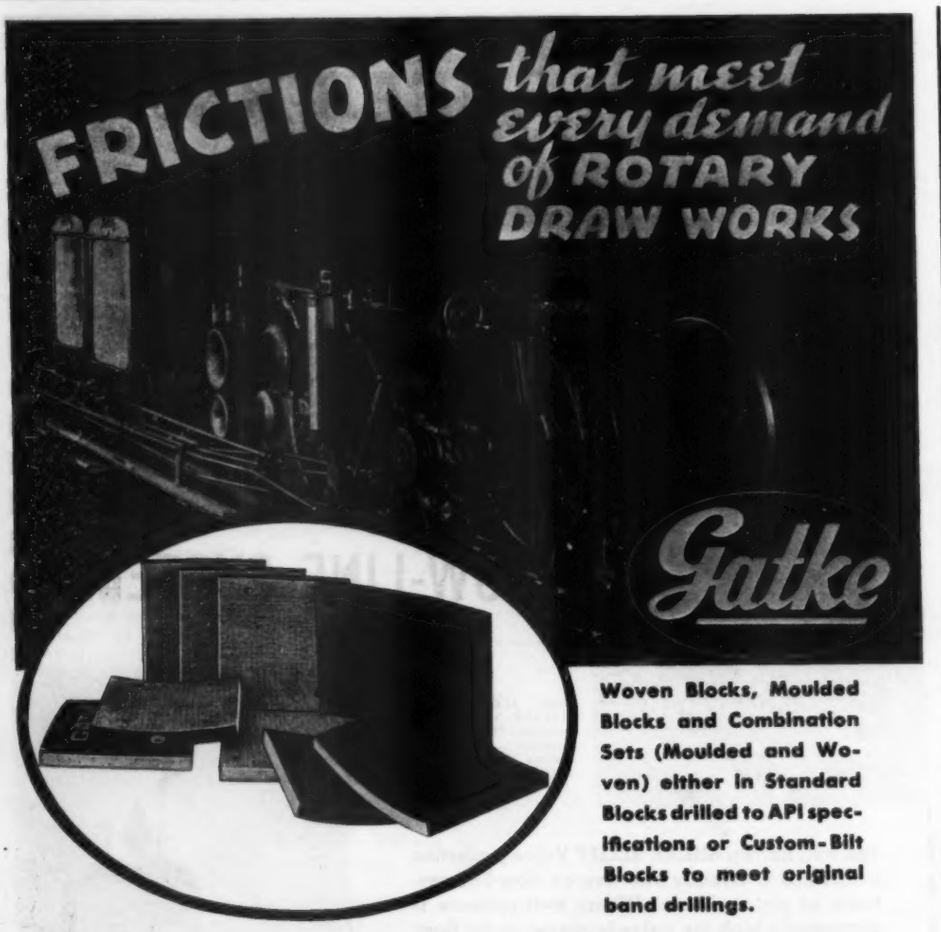
Natrona County

Stanolind O. & G. Co. No. 8 T.P.-Midwest Oil, C NW SW sec. 35-40n-79w. Loc.; W.O. compl. No. 26.
Stanolind O. & G. Co. No. 26 T.P.-Wyo. Asso., C SE NW sec. 35-40n-79w. Cg. 1,015 ft. in Wall Cr.; 16-in. at 218 ft. with 150 sacks.
General Pet. Corp. No. 1 Govt., C NW SE sec. 21-35n-77w. Cg. 7,307 ft.; failed to pick up second Wall Creek sd.

Niobrara County

Continental Oil Co. has released location for its No. 12 Tom Bell Cattle, on the east side of the Lance Creek field, which will test out the limits of the Minnelusa production in that direction. It is an east offset to the Argo Oil Co. No. 5 Ford and a northeast offset to the Ohio Oil Co. No. 5 Cash, a Sundance well.

Continental Oil Co. No. 12 Tom Bell, C SE SE sec. 33-36n-65w. C. & P. (first report).
A. B. Cobb et al No. 3 Novick-Ong, SW SE SW sec. 6-35n-65w. Drlg. 1,665 ft. in sh.
MacKinnie Oil & Drlg. Co. No. 3 Thompson, NW NE NW sec. 7-35n-65w. Drlg. sh. 2,480 ft.
Minnelusa Oil Co. No. 2 H. & M., NW NE NE sec. 8-35n-65w. R.U.R.
Continental Oil Co. No. 11 Tom Bell Cattle, SE SW SW sec. 27-36n-65w. Drlg. 3,460 ft.
Hewitt Bros. and Manning No. 1 Pecklow, SE SE SE sec. 1-35n-66w. T.D. 1,225 ft.; fsg.
Continental Oil Co. No. 5 Joss, SW SW NE sec. 6-35n-



Woven Blocks, Moulded Blocks and Combination Sets (Moulded and Woven) either in Standard Blocks drilled to API specifications or Custom-Bilt Blocks to meet original band drillings.

The test of any friction is right in the field, and that's the Gatke test. Developed and proven through thousands of installations; known and demanded by Rotary Draw Works operators in every oil field, the slogan "In the oil field it's Gatke" carries the weight of installation facts—the answer to your replacement problem.

Gatke field engineers are specialists on replacement work. They are always available to help you eliminate braking troubles, insure soft, even brake action under all operating conditions and greatly increase your friction life.

Write for complete information.

GATKE CORPORATION
228 N. La Salle Street Chicago, Illinois

65w. T.D. 3,950 ft.; cmtd. 8⅝-in. at 3,873 ft.; sat. in Sundance 3,874-3,950.
Ohio Oil Co. No. 10 Putnam, NW SE NW sec. 4-35n-65w. Drlg. 3,481 ft.; top Muddy 3,150 ft.
Argo Oil Co. No. 5 Ford, C SW SE sec. 33-36n-65w, T.D. 4,060 ft.; cmtd. 7-in. top basal Sundance at 4,050 ft.; W.O.C.
H. D. Moore et al No. 1 Beregren, NW sec. 23-35n-63w. Drlg. 937 ft. in Sundance; top Morrison 587 ft.
Continental Oil Co. No. 3-A Dielman, SE SE SW sec. 5-35n-65w. T.D. 5,404 ft.; cmtd 7-in. at 5,342 ft. with 625 sacks; prep. to run tbg. and test good sat. in Leo sd. at 5,343-5,404 ft.

Park County

Paul Stock No. 1 Govt., SE SE NE sec. 20-53n-101. Rdy. to resume at 2,015 ft.
Ohio Oil Co. No. 4 Mack-O.P.C.-4, SE SW SE sec. 30-58n-99w. T.D. 3,092 ft.; P.B. to 2,850 ft.; cmtd. 8⅝-in. at 2,790 ft.; tstg.
Resolute Oil Co. No. 4 N. P., C NE NW sec. 21-57n-101. S.D. 8,657 ft.
Resolute Oil Co No. 3 N. P., C NE NE sec. 20-57n-101. S.D. 8,670 ft.

Platte County

The Transylvania Development Co. is building derrick for a test in the center of Platte County, just northwest of the town of Wheatland. The company is composed mostly of business men of Sidney, Neb., with A. A. Potter as field manager. Same interests have derrick up for a well in the West Plains district, Logan County, Colorado, but probably will wait on same until the Wheatland test is completed.

Transylvania Dev. Co. No. 1 Bellis, SE SE SE sec. 3-24n-68w. Bldg. rig (first report).

Sweetwater County

A wildcat which is reaching an interesting stage is the Salegna Oil Co. No. 1 Union Pacific, SW SW section 11-20n-104w, North Baxter Basin district. It is several miles north of the nearest gas well and close to the axis of the Rock Springs anticline as mapped in Bulletin 702 of the U. S. Geological Survey. At last report it was bottomed at 4,196 feet and trying to free frozen drill pipe. It had the Frontier at 3,255-61 feet and the Dakota at 3,842-54 feet. Cores from the Dakota are reported to have shown considerable oil saturation, but upon testing, developed water. The well was drilled to 1,720 feet in 1920 by the Scoville interests, of Salt Lake City. The new interests moved in last December to complete it with rotary.

In 1926 the old Producers & Refiners Corp. and Marland Oil Co. drilled a joint test on Union Pacific land in the NW section 11-19-104, nearly 6 miles to the south, the most northerly gasser in the field. It had 121 feet of Dakota sand at 3,068 feet and was completed for 12,587,000 feet. The location was 236 feet north of a major fault and the gas was entirely different from that in North Baxter Basin, testing 98 per cent methane.

In connection with this development a report from a usually reliable, but unofficial, source says that the Rocky Mountain Drilling Co. No. 1 Lee, NE NW SE section 10-19n-104w, reported a completion last week in the Sundance at 3,650 feet for 6,600,000 feet of gas per day, encountered shows of oil in the Dakota. This well is nearly 6 miles south of the Salegna well and half a mile southwest of the old P. & R. well in section 11, and close to the fault. Subsequently an official report stated that it had a show of gas with water in the Dakota at 3,093 feet.

Sinclair-Wyoming Oil Co. No. 78, SW SW NW sec. 11-26n-90w. Drlg. 2,357 ft. in r.b.; Sundance at 2,026-2,343 ft.
Salegna Oil Co. No. 1 Union Pacific, SW SW sec. 11-20n-104w, T.D. 4,196 ft.; trying to free frozen D.P.

Weston County

Osage field production in March was 28,200 bbls., and refiners took from the field and storage 32,500 bbls.

One completion was reported in the shallow area on the east side in the Patterson Oil Co. No. 19, CSL SE SE section 17-46n-63w, which pumped 20 bbls. per day from sand at 543-554 feet after a shot with 20 quarts.

Chas. F. Martens No. 9, NE SW NE sec. 23-46n-64w. Tstg. W.S.O. with 8¼-in.
Chas. Stough No. 11, CSL SW NW sec. 4-46n-63w. Drlg. below 100 ft.; (first report).
Osage Trust Co. No. 29, NW SE SW sec. 14-46n-64w. Cmtd. 8¼-in. at unreported depth.
John Brorphy No. 1 George SW SE NW sec. 26-48n-64w. T.D. 2,021 ft.; landed 6⅝-in. on btm. and prep. to drill into Leo sd.

MONTANA

Montana fields produced 383,718 bbls. in February, according to the reports of the State Oil Conservation Board, an increase of 2,868 bbls. as compared with January. Storage at the end of February was 1,461,131 bbls., an increase during the month of 55,537 bbls.

Big Horn County

P. O. Oil & Gas Co. No. 1, NW NE NE sec. 25-9s-35e. Drlg. 340 ft.
E. L. Dana No. 1 Hardy, SW NW sec. 22-9s-35e. S.D. 700 ft.

Carbon County

R. C. Tarrant No. 1, 500 ft. W of C sec. 3-6s-18e. Drlg. 75 ft.
R. C. Tarrant No. 2 Heare, NW SE NW sec. 14-6s-19e. T.D. 1,700 ft.; drlg. by tools.
Sha-Wa Pet. Co. No. 1 Govt., SW SW NE sec. 35-9s-23e. T.D. 3,223 ft.; P.B. to 3,060 ft.; fsg.
Miracle Oil Co. No. 2 Govt., CWL NE SE sec. 3-6s-23e. Drlg. 2,371 ft.; 5⅞-in. at 2,360 ft.

Fergus County

Baugham & Singley No. 1 Skaggs, C NW SW sec. 7-15n-20e. S.D. 525 ft.

Glacier County

The Glacier Production Co. had an important completion in its No. 1 McNamar Unit, CEL SE NE section 15-36n-5w, at the northern end of the Cut Bank gas area. It was completed at 2,664 feet for 17,000,000 feet open flow. It had sand at 2,480-2,500 feet which showed for 2,000,000 feet. In sand at 2,535-37 feet the gas increased to 2,850,000 feet. Big increase was encountered in sand at 2,650-62 feet. The horizon is not definitely identified in the reports. The 7-inch was cemented at 2,488 feet and elevation is 4,030 feet.

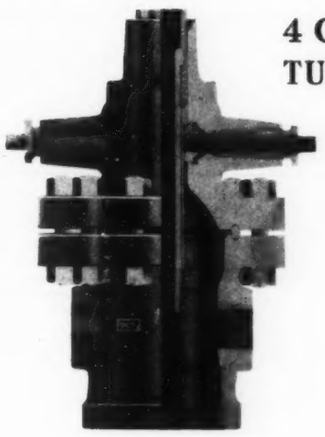
The location of the McNamar well is one and one-half miles north of the Texas Co. No. 1 Peterson, SW NE SE section 22-36n-5w, which was completed in 1932 at 2,740 feet as a small gas well. This is the nearest gas well in the direction of the field proper. In 1935 the Texas Co. had a dry hole at 2,973 feet in the C W half section 23, half a mile northeast of its No. 1 Peterson and one and one-fourth miles southeast of the McNamar discovery. Last year the Glacier company's No. 1 Reynolds, CWL section 15, half a mile southwest of the McNamar well, was dry and abandoned at 2,840 feet. These two dry holes, a mile apart, between the new producer and the developed area possibly may point to the discovery of an important gas district on the north.

Nadeau Bros. No. 5 Farmers State Bank, CEL SE NE sec. 17-33n-5w. Drlg. 545 ft.
Glacier Prod. Co. No. 2 Eisler, SW NE SW sec. 5-33n-5w. R.U.
Santa Rita O. & G. No. 1 Jordan, NW NW SE sec. 18-32n-5w. R.O.G.
K. D. Pardee No. 1 Drumheller, NE NW (C Lot 3), sec. 2-33n-6w. R.O.G.

(Continued on Page 229)

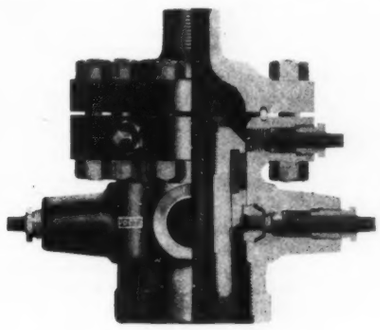
WHAT IS YOUR COMPLETION PROBLEM?

4 OF THE 20 TYPES OF O-C-T TUBING HEADS TO CHOOSE FROM



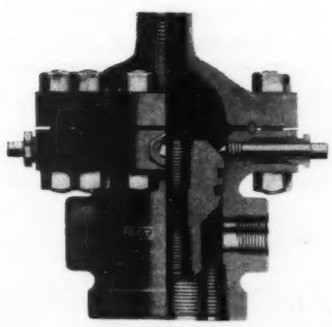
TYPE "T-19"

Retractable hanger seats permit tubing collars and tubing hanger to pass through head to facilitate washing behind liner and setting packer. After drilling plug and running few joints of tubing with liner and packer, blowout preventer is replaced by Christmas tree made up on top of Tubing Head connection, which is stripped over tubing and installed on body of head. O-C-T Stripper Rubber Blowout Preventer installed above Christmas tree permits running tubing to bottom in safety, collars and hanger passing through stripper rubber which serves as a stuffing box while washing behind liner. After washing and setting packer, tubing is raised to suspension point and retractable seats screwed in to engage hanger.



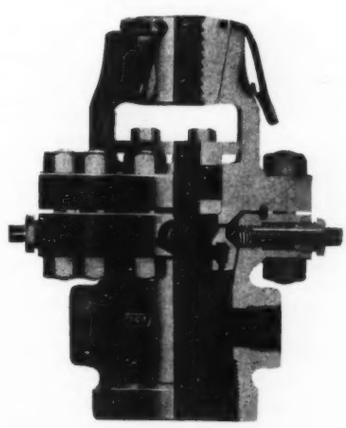
TYPE "Q-1"

Permits drilling in, running and landing tubing under pressure with blowout preventer equipment installed above. Retractable hanger seats permit raising or lowering of tubing after well is completed. Lock down screws force hanger into sealing position. Tubing is suspended from threaded hanger which seats on retractable seats.



TYPE "T-16"

Used with flanged blowout preventer equipment for running and landing tubing under pressure. Hanger passes through master gate and blowout preventer, seating in bowl of body and hold down screws force it into sealing position. Permits reworking under pressure, using tubing choke and reinstalling blowout preventer equipment.



TYPE "T-16C"

Permits drilling in and running and landing tubing against pressure through blowout preventer equipment. Provided with stripper rubber which can be replaced at any time through blowout preventer equipment. Packing in stuffing box below slips can be tightened at any time without disturbing any part of the well hook-up. Slip suspension of tubing.

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Texas and Louisiana Gulf

By
NEIL WILLIAMS

Large Distillate Producer in the Jefferson County Field

HOUSTON, Tex., Apr. 11.—The mystery well of West Production Co., No. 1 G. M. Snowden, located in the Clear Lake area, northeast of the Friendswood field, southern Harris County, continued to hold interest along the Gulf Coast, as preparations were made for a second production test. While detailed information on the well has been withheld by the company, it is reported that it tested salt water through perforated casing at 5,850-70 feet, and showed 800 pounds of tubing pressure and 1,000 pounds of casing pressure. If this report is accurate, the best section of the formation has been tested, as a 43-foot section of sand showing oil was reported to have been logged at 5,852-95 feet. Some are of the opinion that the perforations were made below 5,900 feet in order to definitely establish the water level and that the second test will be made in the 5,800-foot horizon.

Although the discovery well has not been completed, the railroad commission issued a temporary emergency order, setting a 20-acre spacing rule in effect, and called a regular hearing on the field to be held April 19. Application for numerous permits were made after reports that oil sand had been cored. West Production Co. has derrick up for No. 1-A fee, in the George B. McKinstry about 2,350 feet east of the present well.

Preparations were being made by O. W. Killam to test No. 1 J. W. Sweeney Estate, east of the old Ogburn Prospect in the northwestern part of the county. The hole was drilled to the Conroe sand at a total depth of 6,736 feet, and 5½-inch casing was cemented at 6,634 feet, preparatory to testing in the Upper Cockfield around 6,500 feet where a Schlumberger survey showed indications of production. The sand section is believed to be comparatively thin, although several cores made in the section were not recovered. Location is in the G. Williams Survey.

Fairbanks Field

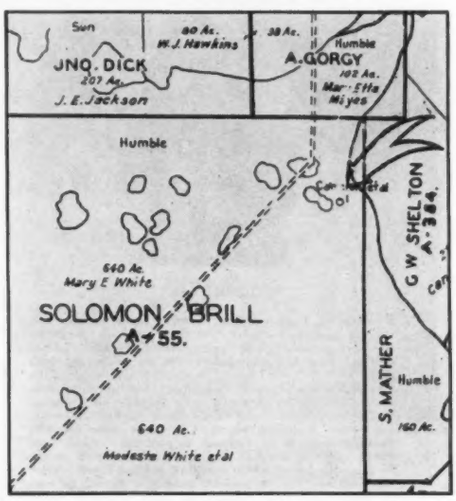
In the Fairbanks field, E. L. Smith and Ownby Drilling Co. No. 2 Meyers, offsetting their No. 1 Meyers in the George Ayers Survey, perforated casing at 6,842-50 feet, and is flowing 18 bbls. per hour through a $\frac{7}{8}$-inch choke. On the east side of the field, one-half mile from production, salt water continues to retard final completion of Amerada Petroleum Corp. and Stanolind Oil & Gas Co. No. 1 E. M. White. The casing was perforated at 6,837-51 feet, and the well flowed 20 bbls. of fluid per hour of which a large percentage was salt water.

Jack Frazier, who opened the first oil production in the Eureka gas field, two weeks ago, will attempt to do the same thing in the Aldine area due north of Houston. Derrick is being built for No. 1 Robert Gillespie in the S. Contreras Survey. Two distillate wells have been completed in that area, both of which found production in the Upper Saline Bayou formation.

Deeper drilling along the Conroe trend was encouraged by the showing of Gulf Oil Corp. No. 6 Ragan which has apparently opened production from the Sparta formation, giving the field its third producing sand. Oil and gas showings were reported last week as having been logged from 8,100-15 feet. A drill-stem test of this section showed 10 feet of oil and 30 feet of oil-cut mud and sand. The hole was deepened and two drill stem tests at 8,146-61 feet showed several hundred feet of pipe line oil and 140 pounds of pressure. The well is being drilled deeper in search of another sand. The outcome is expected to eventually result in deeper drilling in all fields along this trend, including such fields as Conroe, Livingston and several others. The same company has one other deep test drilling below 8,440 feet in the Cleveland field, Liberty County, and another 10,000-foot test is getting under way in the Katy gas field in Waller County by Stanolind Oil & Gas Co.

In the Labelle field, Jefferson County, Sun Oil Co. is attempting to shut in a large distillate producer, but so far its efforts have been futile due to record gas pressures. The well, No. 3 Broussard and Hebert, B. Blackman Survey, attempted to blow out from a total depth of 8,622 feet and was brought under control with the surface pressure showing 5,500 pounds. The pressure increased to 6,100 pounds, whereupon the well was opened and is now flowing 933 bbls. of blue-white distillate with 71,058,731 feet of gas per day. It is flowing through three 2-inch flow lines and has a gas-oil ratio of 78,080 feet of gas to 1 bbl. of oil. The flow is believed to be coming from 8,593-8,603 feet, which is a new sand for the field, as the discovery well was completed at 8,211-16 feet.

Humble Oil & Refining Co. No. 1 State, in the recently opened Cedar Point field, Galveston Bay, cored



W. W. Zingery, Maps, Houston

Plat of the Smiths Point Prospect, Chambers County, showing location of A. A. Cameron and others No. 1 White, an interesting wildcat which has reached a critical depth

sand showing oil in the Miocene at 4,070-73 feet, and gas sand at 4,092-93 feet. It is coring ahead for the Frio sand. The same company made location for No. 2 State in section 95, being 1,860 feet southeast of the present well.

A. A. Cameron and others No. 1 White and others, Smiths Point area, Chambers County, were coring for the Frio sand below 8,100 feet. The well topped the Round Marginulina at 7,921 feet and the Flat Marginulina at 7,972 feet. The Frio section is expected within the next 200 feet.

Approximately 4,500 feet southwest of the McCrosky discovery well in Matagorda County, Superior Drilling Co. No. 1 Paul Kruger has been completed for an initial production of 15 bbls. of 40-gravity oil per day through a ⅛-inch choke. Production was obtained by plugging back to 6,700 feet and perforating casing at 6,689-94 feet. The well has been in process of completion for several weeks as the company had trouble with salt water intrusion. Pierce Estate is moving in for No. 2 fee, 500 feet north of the discovery well in the I.&G.N. Survey No. 7.

In Jackson County, H. J. Porter and others No. 1 Foust which opened Miocene production, north of the town of Edna, is flowing 84 bbls. per day through a 9/64-inch choke with tubing pressure 280 pounds and shut in casing pressure 410 pounds. On the West Ranch, Magnolia Petroleum Co. has derrick up for its second well, No. 1-A West, in the Ramon Musquez Survey.

Bennett Oil Corp. is expected to start drilling on its recently acquired 250 acres in the Palacios field, Matagorda County. The leases were purchased from Glenn H. McCarthy for $125,000. The trade included McCarthy's half interest in three wells, drilled by Atlantic Refining Co.

In the Spring Creek area, Waller County, David B. McDaniel has derrick up for No. 1 C. H. Leverkuhn, 330 feet out of the southeast corner of a 100-acre lease in the Lacy Pearsall Survey. The well is located on a block of 6,500 acres and is scheduled to be drilled to the Cockfield section.

Sun Oil Co. made location for a second wildcat on the Bolivar Peninsula Prospect, Galveston County. It is No. 1 Atkins Estate in the Burrell Franks Survey. It is approximately 2½ miles southwest of the company's No. 1 Cade, which was spudded the past week.

Louisiana Coast

Along the Louisiana Coast, preparations were being made to make a production test of Stanolind Oil & Gas Co. No. 3-B Calcasieu National Bank, in the South Elton field, Jefferson Davis Parish. The hole which is the deepest on the Gulf Coast and the second deepest in the world, was drilled to 13,210 feet, where mechanical trouble developed, and it is planned to complete it as a distillate well in a section from 8,600 to 9,200 feet.

At the old Welsh dome, Jefferson Davis Parish, Stanolind Oil & Gas Co. is moving in material for a second test on the northwest flank. It is No. 2 Conover, 660 feet west of No. 1 Conover, recently abandoned due to mechanical trouble. Location is in section 20-9s-5w.

In the Jennings field, T. C. Markley staked a location for early drilling offsetting Superior Oil Producing Co. No. 1 Clement, recently completed for a good oil well on the extreme northwest flank of the dome. The well is being drilled on a five-acre lease, farmed out by the Gulf Refining Co. in section 45-9s-2w.

In the recently opened Baton Rouge field, East Baton Rouge Parish, William Helis spudded No. 3 Louisiana State University, in section 65-7s-1w.

Texas Co. No. 1 St. Mary Parish Land Co., the second well to be drilled in the Horseshoe Bayou field, St. Mary Parish, is bottomed in salt water at 11,022 feet, and the hole is being reamed. Sands showing oil were logged in the discovery horizon from 10,655 to 10,892 feet. Location is in section 37-23s-33e.

Locations for two wildcats were made in St. Landry and Terrebonne parishes. Western Gulf Petroleum Co. staked No. 1 E. M. Boagni in section 7-8s-4e, while in the Lake Hatch area, Terrebonne Parish, Shell Petroleum Corp. is dredging canal to No. 1-C Realty Operators in section 10-18s-16e.

On the South Crowley Prospect, Acadia Parish, Humble Oil & Refining Co. No. 1 L. B. Finch, section 22-10s-1e, is drilling in shale below 10,031 feet. On the Little Chenier Prospect, the same company's No. 1-B Miami Corp., section 7-14s-6w, stuck drill stem at 9,270 feet and the hole has been plugged back to 8,292 feet, preparatory to sidetracking. These two wells are the most closely watched wildcats in the district, as encouraging showings are reported to have been logged.

COMPLETIONS ON TEXAS COAST

Brazoria County

Danbury field: Foxwood No. 1 Bassett Blakely, 2,065 feet, abandoned. Hastings field: Humble Oil & Refining Co. No. 12 R. Haden, 6,080 feet, 667 bbls., ¼-inch choke. Hay Simmons No. 4 C. H. Alexander, 6,090 feet, perforated casing 6,060-80 feet, 646 bbls., ¼-inch choke. Stanolind Oil & Gas Co. No. 2 Laira B. Bisbee, 6,144 feet, aban-

doned. Lockridge field: Gulf Oil Corp. No. 6-A Wilkes and Smith, 6,368 feet, perforated casing 6,362-64 feet, 389 bbls., 5/32-inch choke. West Columbia field: Adrian Moore No. 2 Gulf fee, 5,416 feet, 300 bbls., ¼-inch choke. Sterling Oil & Refining Co. No. 1 Munson, 5,586 feet, 627 bbls., ¼-inch choke. Texas Co. No. 19 Abrams, sand 5,232-5,429 feet, 597 bbls., ¼-inch choke.

Chambers County

Anahuac field: Humble Oil & Refining Co. No. 12 Zappe, sand 6,765-7,085 feet, 644 bbls., ¼-inch choke.

Galveston County

Dickinson field: Pure Oil Co. No. 5-B Shelor, 8,005 feet, perforated casing 7,970-74 feet, 410 bbls., ¼-inch choke. High Island field: Stanolind Oil & Gas Co. No. 64 Cade, 5,194 feet, perforated casing 5,028-58 feet, 261 bbls., ¼-inch choke.

Harris County

Fairbanks field: H. E. Williams No. 1-A Vega, 6,835 feet, flowed 8 bbls. per hour, casing split, abandoned. Friendswood field: V. H. Borsodi No. 2 Berlowits, 6,220 feet, abandoned. Tomball field: Humble Oil & Refining Co. No. 2-B Stallones, 5,580 feet, perforated 5,536-45 feet, 2,323,000 feet of gas. Humble Oil & Refining Co. No. 2 Martnes, 5,571 feet, perforated casing 5,564-70 feet, 21 bbls. per hour, ¼-inch choke.

Jefferson County

Amelia field: Glenn H. McCarthy No. 8 Longe, 5,403 feet, 362 bbls. net oil, 20 per cent salt water, ¼-inch choke.

Liberty County

Hardin field: Gulf Oil Corp. No. 1 Tullos, 7,628 feet, perforated casing 7,607-17 feet, 372 bbls., ¼-inch choke.

Wharton County

Withers field: Texas Co. No. 7-A C. Thompson, 5,551 feet, 303 bbls., ⅞-inch choke.

La.-Ark. Fields

(Continued from Page 212)

of gas to one barrel of oil. This extends Buckner to the northeast. The company has moved the rotary to No. 2 Crone, located between No. 1 Crone and No. 1 McKean, the discovery well.

Miller County, Rodessa

In the Miller County sector of Rodessa three producers were brought in during the week. Burden & Cummings No. 1 Treadway, section 10-20-28, made 33 barrels per hour through a ½-inch choke, after acidizing with 2,000 gallons. Total depth is 6,137 feet.

B. B. Orr No. 1 Mitchell, section 10-20-28, gauged 50 barrels per hour through a ½-inch choke, with a tubing pressure of 75 pounds. Total depth is 6,156 feet.

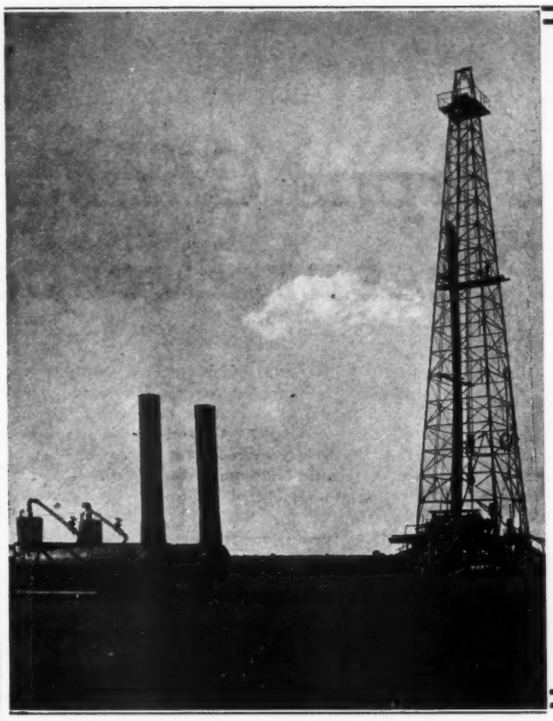
Mrs. S. O. Thompson brought in No. 1 Concord Methodist Church, section 10-20-28, for 47 barrels per hour through a 40/64-inch choke, with tubing pressure 375 pounds and casing pressure 150 pounds. Total depth is 6,147 feet.

Shuler Extension

The Shuler field, Union County, Arkansas' most active development, passed its first birthday with increased drilling, and the completion of an important northeast extension. The Alice Sydney Oil Co. No. 1 Powledge, section 7-18-17, made 1,576 barrels in 23 hours through ½-inch and ¼-inch chokes. The larger choke was used for the first 8 hours of the gauge. Tubing and casing pressures were equalized at 1,000 pounds.

The Lion Oil Refining Co. No. 1 Miller, section 18-18-17, made 1,069 barrels per day through a ⅝-inch choke, with tubing pressure 750 pounds and casing pressure 2,000 pounds.

Proration of the Shuler field, affecting production in the Jones sand, was again cut this month. The new order names 550 barrels as the daily allowable production per well in that horizon, representing a 100-barrel decrease from the former figure. The order, effective April 10, was made to determine the effect of a decreased production on the next bottom-hole-pressure survey to be conducted in the field. Shuler, in its first year produced in excess of 2,500,000 barrels of crude, from the Morgan sands and the Jones sand of the Shuler facies of the Cotton Valley formation, and the Reynolds oolitic lime of the Smackover lime.



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Southwest Texas District

By
F. L. SINGLETON

Corpus Christi and Laredo Present Prospective Pools

CORPUS CHRISTI, Tex., Apr. 11.—In the Corpus Christi sector of the Southwest Texas district, preparations were being made to test two prospective pool openers in San Patricio and Jim Well counties, while in the Laredo and Balcones Fault line district, several shallow wildcats showed evidence of production.

Seven-inch casing was cemented on bottom at 4,836 feet in Humble Oil & Refining Co. No. 1 Smith and Tolbert, which last week showed promise of opening a new field, 9,200 feet east of the Plymouth field in San Patricio County. The hole is bottomed in the Greta sand (Heterostegina) topped at 4,808 feet. From the top of the section to 4,814 feet the sand carried gas, while from 4,814 to 4,829½ feet the section was composed of broken sand showing oil and gas. Sand with an oil showing and a salty taste was logged at 4,831-36 feet.

The first drill-stem test was made at 4,804-17 feet, and it showed 550 pounds of pressure in eight minutes. The last test was made at 4,829-36 feet and yielded 350 feet of salt water with a slight show of oil in four minutes. Casing was cemented following the running of a Schlumberger survey which showed a saturated section at 4,815-29½ feet.

The well is in section 37 of the fourth addition of the Taft Farm lands, on a block of several thousand acres, largely controlled by Humble Oil & Refining Co., although protection is held by Sun Oil Co., Atlantic Refining Co. and Shell Petroleum Corp. Since the Plymouth field to the east is producing mainly from the Frio section it is very doubtful if this structure is connected with that field.

To the southwest in the recently opened East White Point field, Plymouth Oil Co. was preparing to test No. 1 W. H. Nelson, an east offset to the discovery well. A drill-stem test at 5,675-86 feet, the discovery horizon, yielded 1,780 feet of pipe line oil in 12 minutes.

Jim Wells County

Approximately 2 miles east of the town of Ben Bolt, Jim Wells County, Earl Calloway and others No. 1 Garcia, King Survey No. 62, was scheduled to be tested after casing was cemented at approximately 6,000 feet. The well showed considerable pressure last week and it was decided to cement casing after a Schlumberger survey showed sands at intervals from 4,850-5,848 feet. The well is southeast of Howell and others No. 1 Talbot, recently abandoned after showing for a gas well, and is northeast of the East Premont field, the discovery of which opened the first important Frio production in the county. On the same trend and located about 4 miles northeast of H. H. Howell No. 1 Talbot, Homer Presnall and others No. 1 Bankers Mortgage Investment Co. has been completed as a gas well with a slight show of distillate. Production was obtained by perforating casing at 3,492-95 feet. While flowing through ⅛-inch choke it showed 1,440 pounds pressure on the tubing and shut-in casing pressure of 1,450 pounds. It is shut in to make a railroad commission potential gauge.

To the north in the adjoining county of Live Oak, two important deep wildcats are proposed. One and a half miles north of Hantho-Nelson No. 1 McNeill, recently completed for a gas well, J. B. Chew and others are reported to have made tentative location for a deep test, while in the southern part of the county and southwest of the Lucas field, the same operator plans to drill a 6,700-foot test on the Cartwright lease in Abstract No. 334.

West Saxet

The east side of the active West Saxet field, Nueces County, was believed to have been defined with the showing of Renwar Oil Corp. No. 1-A Kennedy, D. Martinez Survey. Late in the week it was coring in dry sand below 5,869 feet and failed to log any saturation in the "Douglas sand" which is topped at approximately 5,800-29 feet. The well is approximately 4,250 feet east of production. A southwest extension of several hundred feet was indicated by Renwar Oil Corp. No. 1 Harrington, B.S.&F. Survey 417. A 20-minute drill-stem test at 5,794-5,838 feet recovered 3,720 feet of oil and 20 pounds of pressure through a ¼-inch choke. Seven-inch casing was cemented on bottom at 5,838 feet. Southern Mineral Corp. No. 1 French, an outpost well, southwest of production, is running a Schlumberger survey at 5,975 feet after 2,160 feet of salt water was recovered on a drill-stem test at 5,909-24 feet. On a drill-stem test last week in the 5,800-foot sand, it showed several hundred feet of pipe line oil and 90 feet of salt water.

Additional drilling in Laguna Madre Bay, offsetting production at the Flour Bluff field, was assured with the completion of the first producer by Sinclair Prairie Oil Co. While a full 24-hour gauge had not been received on No. 1 State, it flowed 73 bbls. of fluid in 16 hours while cleaning through a ⅛-inch choke. Sand was logged at 6,653-66 feet, the total depth and the well was completed through perforated casing at 6,653-60 feet. The same company's No. 2 State cored sand at 6,656-64 feet, and 7-inch casing was cemented on bottom.

A revival of interest in the Agua Dulce field, Nueces County, was reflected from discovery of Union Producing Co. No. 1 J. W. Torbett which has provided the first real oil producer for the field when it flowed 480 bbls. of 40-gravity oil per day through a ¼-inch choke. The well has been placed on a ⅛-inch choke and is flowing 75 bbls. per day with casing pressure 1,375 pounds and tubing pressure 950 pounds. The hole is bottomed at 7,700 feet and production was obtained by perforating casing at 5,295-5,307 feet. This field has been looked upon as a large gas reserve as practically all wells are producing a large amount of gas along with various amounts of distillate. No. 1 Torbett is located on the extreme west side of the field in section 31 of the Benton Pasture Subdivision.

The east side of the Luby field, Nueces County, was defined with the abandonment of Seaboard Oil Corp. No. 6 Katherine Luby Shaffer, which was quit at 5,081 feet. Location is in section 3, Block 2 of the Luby Subdivision. Approximately 3,700 feet west of production in Block 2, Share 1, of the Colony Ditch Subdivision, the same company's No. 7 Luby was coring below 7,000 feet and had failed to log any encouraging showings.

In McMullen County, Heard, Hall & Young No. 1 Ed Bryne, C. Pittuck Survey, found a sand showing oil and gas at 784-90 feet. A 15-minute drill-stem test at 782-90 feet showed 600 feet of salt water and some gas. The hole was cored deeper, and at 950-54 feet, sand with an oil odor was recovered. At 965-75 feet, the total depth, sand, with shale streaks showing oil, was logged. Casing is being run for a production test.

In the Maetze area, Goliad County, Windward Oil Co. and others are preparing to make a production test of No. 1 Dreier. Several weeks ago the well attempted to blow out at a total depth of 5,530 feet, and the hole was plugged back and sidetracked. Sand showing oil and gas was logged at 3,802-14 feet, and casing has been cemented for a production test. No. 1 Dreier is about a half mile northeast of No. 1 Maetze, completed last year as a gas well in a sand at 3,380-88 feet.

Laredo District

Two shallow pools were apparently being opened in the Laredo district in Duval County. West of the Seven Sisters field, approximately 1½ miles, V. G. Schimmell No. 5 Hagist, B.S.&F. Survey, section 265, was rigged up to pump after the hole filled several hundred feet with oil and showed 250 pounds of pressure. Sand was cored to 2,193-96 feet, the total depth, and 7-inch casing was cemented at 2,190 feet.

In the northwest part of the county, H. G. Foster Survey 342, G. Stratton and others No. 1 Afflerback cored oil sand at 1,091-97 feet, total depth, and 7-inch casing was cemented at 1,084 feet. Several wells have been drilled in this immediate area and some encouraging showings were logged.

In the Balcones Fault line district, preparations were being made to test three shallow prospective pool openers in Medina County. Ewing Oil Co. No. 1 Riff, Survey 42, which logged encouraging showings in the Serpentine sand last week was drilled to a total depth of 716 feet and 5⅛-inch casing was cemented at 542 feet for a production test.

J. R. Trentman and others No. 1 Carle Mercantile Co., V. A. Johnson Survey, which had logged saturation in the Buda lime section, is bottomed at 1,905 feet and the hole is being acidized after 7-inch casing was cemented at 1,835 feet. J. W. Cromwell No. 1 J. W. Tondre, a proposed Trinity test in the I. J. Rogers Survey No. 18, topped sand showing oil at 520-65 feet, and the hole is being carried deeper after it was bailed dry.

In Bexar County and located 12 miles south of San Antonio in the Rodriquez Survey, Luling Oil & Gas Co. is starting an Edwards lime test on the Russell lease of 200 acres.

COMPLETED WELLS

Completed wells in proven Southwest Texas fields, with their total depth and initial 24-hour production of the producing wells were as follows:

Brooks County

Alta Mesa field: Standard Oil Co. of Texas No. 7 Mestena Oil & Gas Co. 2,491 feet, 94 bbls. bluid, 20 per cent water, pumping. Alta Verde field: Taylor Refining Co. No. 1 Singer, 2,510 feet, abandoned.

Caldwell County

Luling field: C. H. Mee No. 5 Cosey, 2,173 feet, 30 bbls. oil, 800 bbls. water, pumping.

Duval County

Benavides field: Hiawatha Oil & Gas Co. No. 9 Parr, 5,518 feet, plugged back 5,516 feet, perforated casing 5,510-15 feet, 5 bbls. per hour, 5/32-inch choke. Navarro Oil Co. No. 3 West, 5,330 feet, 157 bbls., 15 hours, ¼-inch choke. Standard Oil Co. of Kansas No. 7 Walstad, 5,381 feet, 75 bbls., 5/32-inch choke. Hoffman field: Cox & Hamon and others No. 6 Hoffman-Conway, 2,912 feet, perforated casing 2,510-30 feet, 35 bbls., jetting. Piedra De Lumbre field: Magnolia Petroleum Co. No. 26 Duval Ranch Co., 2,025 feet, 70 bbls., jetting. Seven Sisters field: Reynosa Oil Co. No. 4 Welder, 2,639 feet, 8 bbls. per hour, ¼-inch choke.

Guadalupe County

Darst Creek field: United North and South Development Co. No. 7 Dix, 2,500 feet, 147 bbls. fluid, 2 per cent water, pumping. Nash Creek, Carver-Kallison No. 1 Ranft, 3,116 feet, abandoned.

Hidalgo County

Samfordyce field: Wheeler & Ware No. 1 Pena, 3,021 feet, 5½ bbls. per hour, ¼-inch choke.

Jim Wells County

Alfred field: Rowan & Hope No. 2 Adams, 3,252 feet, 105 bbls., ⅜-inch choke. Smith & Storey No. 1 Adams, 3,392 feet, 175 bbls., 12 hours, ¼-inch choke. East Premont field: Magnolia Petroleum Co. No. 8 Seeligson, 6,593 feet, 20 bbls. per hour, ¼-inch choke.

(Continued on Page 229)

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THE WHELAND COMPANY

ROTARY DRILLING EQUIPMENT

Chattanooga, Tenn.

North and East Texas

By MITCHELL TUCKER

Archer County Deep Sand Is K. M. A. Featured Attraction

WICHITA FALLS, Tex., Apr. 11.—The K.M.A. pool of Wichita and northern Archer counties continues to prove itself one of the world's major oil fields in area as statistics for the month of March reveal. The total number of completions for March more than doubled those for February, while the monthly production for March far more than tripled that of the preceding month. During March there were 113 wells completed in Wichita County for an aggregate daily initial production of 73,672 bbls., an increase of 49,989 bbls. over the February total of 23,583 bbls. from 49 completions.

Owners of the new Panther deep pool discovery in Archer County, Blackwell Oil & Gas and Helmerich & Payne, were seeking to classify their well as an individual pool separate from the K.M.A. pool. A temporary allowable of 100 bbls. has been set for the well pending a Texas Railroad Commission hearing on April 18. Should the area be declared not a separate pool, the well will assume the K.M.A. field's allowable of 58 bbls. per day.

Shell Petroleum Corp. was reported to have leased all available acreage in blocks 117, 120 and 121 out of the Luke Wilson Estate in the eastern part of Archer County. The block lies just east of the Chalk Hill field and several miles southeast of the new Panther pool. This purchase adds considerable acreage to Shell's already accumulated territory on the northwest-southeast trend of the K.M.A. pool, the new deep Panther pool, and the Lower Strawn production at Chalk Hill.

Blackwell Oil & Gas and Helmerich & Payne No. 2 Wilson, 1,000 feet southeast of their discovery in the Panther pool, centered the majority of the interest at the close of the week as it drilled ahead below 3,721 feet in sand. Kilgore-Luginbyhl & Johnson No. 1 W. Ford, in the T. Cecil Survey, about 3 miles northeast of the discovery well, was drilling below 3,940 feet in shaley lime. Reno Oil Co. No. 10 Wilmont, southeast corner of Lot 6, section 4, S.P. Survey, about 2 miles southwest of the Panther discovery well, was drilling below 3,080 feet in a previously abandoned hole drilled several years ago in search of shallow production. Two miles northwest of the discovery, C. W. Snoddy No. 1 Jones-Cullum, in the T. Freeman Survey, Abstract 134, was drilling below 3,330 feet. Lewis Production Co. will plug and abandon No. 1 Frey, section 17, Palo Pinto County School Lands Survey, 2⅛ miles southwest of K.M.A. production in Archer County, at a total depth of 4,127 feet after failing to make a commercial producer from the small section of Lower Strawn saturation encountered. This wildcat was actively drilling before the Panther pool discovery was made. Fain & McGaha Oil Corp. No. 1 Mrs. W. M. Fuller, section 12, Block 1, H.&T.C. Survey, in northeast Archer County and 5 miles south of Wichita Falls, has derrick up for a 5,000-foot test.

Farther north and in Wichita County, the K.M.A. pool extension activities were slightly overshadowed by the interest aroused in Archer County. Cargo Crude Oil Purchasing Corp. of New York announced last week its tentative plans to buy up to 10,000 bbls. of crude oil daily in the K.M.A. pool. The company plans to build loading racks in the field where the oil will be shipped in tankcars to New York for export, principally to France and England. Texas Railroad Commission's policy has been to permit producers an extra allowable if excess is sold for export only.

The only possible extensioner in K.M.A. proper nearing the testing stage last week was C. W. Boller No. 1 S. Y. Collins, in the C. Roberts Survey, Abstract 540. This well is critically situated 3 miles west of production on the Consolidated Oil Co. Ferguson lease, 1¼ miles north of the Geier Brothers & Jackson No. 1 Ancell dry hole, and 1¾ miles southwest of Bolin & Whittington No. 1 Waggoner, recently completed as a west extension. Saturated sand was cored at 3,860-80 feet and operations are suspended waiting for cement to set around the oil string at 3,800 feet.

EASTERN TEXAS FIELDS

DALLAS, Tex., Apr. 11.—The Flag Lake pool of northwestern Henderson County received its second setback last week when DeArman and others plugged and abandoned No. 1 L. L. Persons in the G. Hancock Survey, 1½ miles northeast of production. This failure, considered with the Hunt and others No. 1 Dawdy failure on the north edge of the pool, a northeastern offset to the discovery well, tends to limit the possibilities of further northern expansion. On the southern edge of the pool, the Texas Co. added the fourth producer for the area last week by the completion of No. 1 F. H. Jarrell, in the G. Hancock Survey, an eastern offset to the Hines & Hancock producer, for an initial production of 327 bbls. per day from a 9-foot section of sand from 3,079-88 feet.

Houston County Discovery

Contrary to last week's indications as a dry-gas producer, Humble Oil & Refining Co. No. 1 Dailey, wildcat, in the Juan de la Reivere Survey, 10 miles west of the Grapeland gas-distillate area in northwestern Houston County, is now showing as an oil producer. Casing was perforated from 5,981-93 feet and on a two-hour drill-stem test, through 5/64-inch choke the well made 10 bbls. of oil and wash water and an estimated 200,000 feet of gas. Tubing pressure was 1,300 pounds and casing pressure 200 pounds.

Deep Tests

Two wildcats in East Central Texas with the Lower Marine Trinity as the objective were drilling ahead at the close of the week. Humble Oil & Refining Co. and Gulf Oil Corp. No. 1 Robertson, in the M. Mann Survey, 2½ miles southwest of Longview, Gregg County, was drilling below 9,588 feet. In Upshur County, American Liberty Oil Co. and Tom Hunter No. 1 J. P. Carter, in the J. H. Fields Survey, 1 mile north of Kelsey, is drilling below 8,199 feet in hard sand and shale. Stanolind Oil & Gas Co. No. 1 Tenny Norris, K. Thrasher Survey, Limestone County, continues to test the upper sands as it plugs back from its original total depth of 9,951½ feet. Last week on a drill stem test at 3,506-3,635 feet, through ¼-inch top and bottom choke, 34 feet of mud showing no oil or salt water was recovered. Operators will next perforate casing and test the Buda lime section.

Wildcats

Activity in the East Central Texas district last week showed an increase over the past few weeks, both in completed wells and in new locations, as five new wildcats were staked in the area during the past seven-day period. Two of these, Boone & Jordan No. 1 U. S. G. Crouch, and Gassage and others No. 1 Mrs. C. H. Elliot, were in the Joel Clapp Survey, about 7 miles north of Trinity in Trinity County. In Angelina County, Ginter Brothers staked No. 4 Copes Heirs in the J. Morin Survey, 3 miles east of Dibol. Markraley No. 1 R. S. Morris was staked in the C. Gibbs Survey, 2 miles south of Grand Prairie in Dallas County. In Upshur County, E. J. Dupree made location for No. 1 W. A. Lawrence in the R. Polly Survey, 4 miles south of Gilmer.

EAST TEXAS FIELD COMPLETIONS

(One-hour gauges)

Gregg County—Longview Area

Arkansas Fuel Oil No. 12-B Lathrop, 3,594-3,618 feet, 72 bbls. Atlantic Refining Co. No. 20 Pritchard, 3,494-3,600 feet, 95 bbls. Deep Rock and Murphy No. 20 Murphy, 3,547-52 feet, 80 bbls. Fain & McGaha No. 13-A Booknight, 3,564-3,614 feet, 100 bbls. Humble Oil & Refining Co. No. 28 Lawrence, 3,615-36 feet, 65 bbls.; No. 29 Lawrence, 3,598-3,610 feet, 65 bbls. Iowa-Payne Oil Co. No. 7 J. W. Aiken, 3,528-71 feet, 74 bbls. Magnolia Petroleum Co. No. 10 J. Allen, 3,672-3,706 feet, 85 bbls.; No. 21 Ziegler, 3,456-70 feet, 100 bbls.; No. 10 T. W. Tuttle, 3,564-75 feet, 100 bbls. Roosth-Genecov No. 4 G. C. Smith, dry and abandoned at 3,879 feet. Shell Petroleum Corp. No. 17 Stinchcomb, 3,464-3,521 feet, 60 bbls. Sinclair Prairie No. 58 Moncrief, 3,562-3,701 feet, 60 bbls. Stanolind Oil & Gas Co. No. 61-B J. C. and R. S. McKinley, 3,554-90 feet, 51 bbls. Tide Water Oil Co. No. 46 Lake De Vernia, 3,516-57 feet, 72 bbls.

Gregg County—Kilgore Area

Gulf Oil Corp. No. 9 S. B. Hall, 3,660-65 feet, 60 bbls.; No. 26 R. H. Still, 3,536-3,602 feet, 53 bbls. Island Oil No. 8 R. G. Rigister, 3,650-52 feet, 76 bbls. T. W. Lee No. 2-B J. R. Carter, 3,606-07 feet, 30 bbls. Pierce & Moore No. 4 James, 3,535-50 feet, 40 bbls. Shell Petroleum Corp. No. 42 W. W. Elder, 3,552-3,651 feet, 60 bbls. Sun Oil Co. No. 16 E. S. Smith, 3,629-31 feet, 60 bbls.

Rusk County—Kilgore Area

American Liberty Oil No. 12-B Christian, 3,673-3,722 feet, 20 bbls. Gerier Brothers No. 10 Williamson, 3,714-15 feet, 15 bbls. Shell Petroleum Corp. No. 21 W. P. Moore, 3,682-3,762 feet, 65 bbls. Stanolind Oil & Gas Co. No. 8 Christian, 3,651-52 feet, 33 bbls.; No. 9 Christian, 3,686-86½ feet, 20 bbls.

Rusk County—Joiner Area

Crabtree & Jefferies No. 10 Giles, 3,680-3,727 feet, 40 bbls. General American No. 3 Maxwell, 3,751-52 feet, 80 bbls.; No. 14 Thompson, 3,744-54 feet, 80 bbls. Humble Oil & Refining Co. No. 30 Thompson, 3,673-84 feet, 70 bbls.; No. 31 Thompson, 3,672-84 feet, 70 bbls. Hunt No. 22 C. Young, 3,640-69 feet, 125 bbls. Magnolia Petroleum Co. No. 5 S. W. Moore, 3,646-68 feet, 20 bbls. Ohio Oil Co. No. 10 Price, 3,618-78 feet, 40 bbls. Sanders-Murchinson No. 3 Eaton, 3,729-42 feet, 110 bbls. Sinclair Prairie No. 72 Kinney, 3,635-3,804 feet, 60 bbls. Stanolind Oil & Gas Co. No. 36-A Maxwell, 3,752-3,823 feet, 37 bbls.

Upshur County—Longview Area

Margay Oil No. 17 Victory, 3,649-58 feet, 84 bbls. W. L. Pickens No. 15 T. Wells, 3,717-19 feet, 45 bbls. Shell Petroleum Corp. No. 7 W. M. Landers, 3,687-3,747 feet, 60 bbls. Sun Oil Co. No. 23 E. O'Byrne, 3,694-94½ feet, 20 bbls.

EAST CENTRAL TEXAS COMPLETIONS

(24-hour gauges)

Anderson County

In the Long Lake field, McCutchins No. 1 Hutchins, 5,192-5,404 feet, 115,000,000 feet of gas.

Cherokee County

In the Rusk pool, Mercer Oil No. 1 Birmingham Development Co., dry and abandoned at 5,276 feet.

Franklin County

In the Talco pool, Humble Oil & Refining Co. No. 52 King, 4,188-4,320 feet, 119 bbls. A wildcat, White-McGee & Harper No. 1 L. S. Harper, dry and abandoned at 4,600 feet.

Henderson County

In the Flag Lake field, E. T. DeArman No. 1 Persons, dry and abandoned at 3,139 feet. Texas Co. No. 1 Jarrell, 3,079-88 feet, 327 bbls.

Titus County

Humble Oil & Refining Co. No. 12 Blackburn, 4,180-4,305 feet, 256 bbls.

Central West

By STAFF CORRESPONDENT

14 Oil Wells, 8 Dry Holes, in the Fields of Central Illinois

MATTOON, Ill., Apr. 11.—Eight dry holes out of 22 completions in Central Illinois marred the field's record of the past week. Of 14 oil wells, nine were from the Benoist sand in the new Centralia field in Clinton County, the new wells averaging close to 188 bbls. each in initial production. The dry holes were wildcats in Clinton, Marion, Richland and Jefferson counties, and one of them was in section 6-1n-1e, in the Marion County side of the Centralia development. It was abandoned in Cypress sand. No Benoist sand was reported.

The Week's Completions

In the Clinton County side of the Centralia field, Max Conry No. 1 White & Petrea, near SW cor. SE SE SW section 12-1n-1w, had Benoist sand at 1,369-84 feet, and pumped 140 bbls. of oil the first 24 hours. Lilly and others No. 1 Siegler, NW cor. NE NE SE section 12-1n-1w, which pumped 100 bbls. of oil and 250 bbls. of salt water from sand at 1,376-93 feet after a shot on March 25, was completed in the past week. It was pumping 35 bbls. of oil and 35 bbls. of water. Lily, trustee, No. 1 Meyers, NE SE SE SE section 12-1n-1w, pumped 130 bbls. the first day from sand at 1,363-84 feet. Adams Oil & Gas Co. No. 1 Hefter heirs, NE cor. SW NE section 13-1n-1w, was shot with 20 quarts in sand at 1,350-70 feet and started at 90 bbls. per day. Kest & Fox No. 2 Ben Storer, NE cor. section 13-1n-1w, shot with 10 quarts at 1,364-80 feet, made a 240-bbl. well. Mulbach & Pray No. 1 Schumann & Beckmeyer, NE cor. section 13-1n-1w, had sand at 1,363-88 feet and pumped 120 bbls. initially. John Pugh Drilling Co. No. 1 Ansicker, SW cor. SE SE SE NE section 13-1n-1w, started at 210 bbls. after a 20-quart shot at 1,353-81 feet. John Pugh Drilling Co. No. 1 Meyers, NW cor. NE SE section 13-1n-1w, had sand at 1,360-80 feet, which was shot with 15 quarts, the well responding with a 206-bbl. initial production. A. B. Ryan No. 1 Kent, NW cor. SW NE NE section 5-1n-1w, pumped 300 bbls. in 24 hours after a 10-quart shot in sand at 1,355-75 feet.

In the Centralia area in Marion County, Tate & Longoria No. 1 Skipper, SW cor. SE SE NW section 6-1n-1e, townsite, was abandoned at 1,450 feet. Cypress sand at 1,405-45 feet was dry. W. D. Shedden and others No. 1 Pawlica, SW NE SW section 33-2n-1e, was dry and abandoned at 2,002 feet. Benoist sand was at 1,775-89 feet and it was said to have penetrated McClosky lime.

In the Bartelso field in Clinton County, Bartelso Oil & Gas Co. No. 4 Schorman, NW cor. SE SE section 5-1n-3w, was shot with 20 quarts in Cypress sand at 971-99 feet, and produced 90 bbls. initially. Gross, Erling & Murphy No. 1 Eversgerd, SW cor. NW SW section 22-1n-4w, a Clinton County wildcat, had a showing of oil at 880-95 feet but had salt water in the Cypress sand at 1,020-30 feet. It was abandoned.

Sigel & Schlossberg No. 1 Monken, NE cor. SW SW section 4-2n-1w, a Clinton County wildcat, was dry and abandoned at 1,733 feet. It had Benoist sand top at 1,435 feet; Ste. Genevieve lime at 1,556 feet, and St. Louis at 1,665 feet. Another outpost, Penn Illinois Oil Co. No. 1 Noller, SW NW NW section 28-2n-1w, had Benoist sand at 1,431 feet and top of St. Louis at 1,570 feet, where it was abandoned as dry.

In Lawrence County, H. Loeb No. 1 Vandermark, 930 feet from north and 720 feet from east lines of NE quarter section 3-2n-12w (measuring from the Indiana principal meridian), was shot with 40 quarts in Bridgeport sand at 993-1,005 feet and is a 10-bbl. well.

In Richland County, Pure Oil Co. No. 3 John Hundley, C E half SW NE section 5-3n-9e, flowed 450 bbls. naturally from pay at 2,948-53 feet and 2,955-58 feet, total depth 2,995 feet. Same company No. 4 Hundley, NE NW NE section 5-3n-9e, flowed 708 bbls. of net oil after an acid treatment. Pay was at 2,950-56 feet, total depth 2,998 feet. Pure Oil Co. No. 1 Taylor, C E half NE SW section 8-3n-9e, flowed 162 bbls. from pay at 2,945-52 feet, which had been acidized with 1,000 gallons. Kapschull and others are reported to have abandoned No. 1 Porter, NW cor. section 16-3n-9e at 800 feet. DeKalb Syndicate No. 1 Flora Home Oil Co., NW SE NE section 17-3n-9e, an old well, was deepened from 2,955 feet to 2,977 feet and acidized with 1,000 gallons. It pumped 120 bbls. of oil the first day. It was completed in January for 483 bbls. a day initial production. Ypsilanti Oil Co. No. 1 Ansbrook, C N half NE NE section 17-3n-9e, was dry and abandoned at 3,017 feet. It had been acidized and shot but produced only 10 bbls. of oil in 72 hours.

In Marion County, Albachten & Sims No. 1 Nichols, CEL SW SE section 12-4n-4e, a wildcat, was dry and abandoned at 2,855 feet. It topped McClosky lime at 2,720 feet.

In Jefferson County, H. J. Foltz No. 1 Carroll, NE NE SE section 16-2s-1e, a wildcat, was abandoned as dry at 2,380 feet. It penetrated most, if not all, of the regional formations from Menard at 1,405 feet to St. Louis at 2,377 feet, but found nothing but small showings of oil around 2,258 feet. In the Dix pool, Carter Oil Co. No. 1 Copple, C W half SW SW section 9-1s-2e, which made an initial production of 404 bbls. of oil and 8 bbls. of water from Bethel sand at 1,939-56 feet, produced 395 bbls. of oil and no water on the second day.

New Operations

Twenty-nine operations were started in the Centralia field in Clinton and Marion counties in the past week, as follows: Adams Oil & Gas Co. No. 2 Baker, 250 feet from south and 870 feet from east lines of SE quarter section 12-1n-1w, is a rig; A. H. Carpenter and others No. 1 Armon, Lot 2, Block 9, in NW NE SE section 12-1n-1w, location; Shell Petroleum Corp. No. 2 Allison, C SW NW SE section 12-1n-1w, location; Shell No. 3 Allison, C SW SW NE section 12-1n-1w, spudded; George Anderson No. 1 Home B. & L., Lot 13, Block 3, near NW cor. SW NE NE section 13-1n-1w, spudded; J. G. Bailey and others No. 1 Kuhn, SE cor. NE SE section 13-1n-1w, rigging up machine; Bell & Riley and others No. 1 Scasick & Bailey, SW cor. SE NE section 13-1n-1w, drilling at 500 feet; R. Blowers No. 2 Fairview Park, 190 feet from north and 1,900 feet from east lines of section 13-1n-1w, drilling at 685 feet; same operator's No. 3 Fairview Park, 215 feet from north and 430 feet from east lines of NW quarter section 13-1n-1w, drilling at 530 feet; same operator's No. 4 Fairview Park, 1,020 feet from west and 2,420 feet from east lines of section 13-1n-1w, is at a total depth of 1,963 feet, in lime and preparing to drill sand. Cunningham Brothers No. 1 Gun, NE cor. SW SE section 13-1n-1w, rig; Beaton and others No. 1 Kuhn, NE cor. SE NE SE section 13-1n-1w, rigging up rotary; Dallas E. Hawkins No. 1 McNeil, NE cor. SE SE NE section 13-1n-1w, location; Illinois Producers No. 1 Buettner, near SE cor. NW NE SE section 13-1n-1w, rigging up rotary; Kesl & Fox No. 4 Storr, NW cor. NE NE section 13-1n-1w, drilling at 700 feet; Lewis & Bessinger No. 1 Becker, SW cor. NE SE NE section 13-1n-1w, drilling at 180 feet; same operators' No. 1 Lena Hack, SE cor. NE SE NE section 13-1n-1w, location; Muhlbach & Pray No. 1 Schumann & Beckeniger, NE cor. section 13-1n-1w, location; Sparta Oil Co. No. 1 Buettner, NW cor. NE SE section 13-1n-1w, rigging up rotary.

In Marion County, Phelps & Johnson are drilling at 50 feet in No. 1 Dunbar on a Centralia townlot near NE cor. SW NW SW section 7-1n-1e. Ross Coleman had top of Benoist sand at 1,389 feet in No. 1 Marshall, NE cor. SW NW section 18-1n-1e. Crosby & Gill had rig up for No. 1 Winkler, near CNL SW SW NW section 18-1n-1w. Paul Doran has rig up for No. 1 Welborn, NW cor. section 18-1n-1e. I. T. Eason & Co. were moving in rotary tools for No. 1 Bachsmeyer, NW cor. SW NW section 18-1n-1e. B. M. Hastings and others made a location for No. 1 Burgess & Gambill, NW cor. section 18-1n-1e. John Pugh Drilling Co. has rig up for No. 1 Harris, NW cor. SW NW section 18-1n-1e. Redgraves and others made a location for No. 1 Wright & Winchester, NW cor. SE NW NW section 18-1n-1e. Reynolds and others were drilling at 650 feet in No. 1 Willard, near NW cor. SW section 18-1n-1e. All the foregoing are in the city limits of Centralia, and represent new operations seeking to extend production eastward.

Drilling Progress

In Edwards County, Harry Cotton and others are reported to have abandoned the location for No. 1 Hayes in NE NE NE section 4-1n-10e.

In Wayne County, Benedum & Trees No. 1 Gloyd, C E half E half SE section 32-2n-7e, was drilling at 2,925 feet. It topped Bethel sand at 2,908 feet.

In Richland County, Pure Oil Co. No. 16 Coen, C E half NW SW section 4-3n-9e, was at a total depth of 3,000 feet. It had pay at 2,925-33 feet, 2,952-59 feet and 2,965-67 feet. The crew was running 6-inch casing. Pure Oil Co. has a good well not yet completed in No. 1 Pflaum, C N half NE NE section 5-3n-9e. It flowed 1,165 bbls. of oil naturally from pays at 2,952 to 3,006 feet, total depth 3,010 feet. No. 2 Pflaum, C N half NW NE section 5-3n-9e, was drilling at 1,155 feet. Pyramid Petroleum Co. had rotary rigged up for No. 1 University of Chicago land, NW NW NW section 26-4n-10e. Kingwood Oil Co. and others No. 1 Elliott, C N half SE NE section 28-4n-10e, topped McClosky lime at 3,040 feet, and St. Louis at 3,052 feet, total depth 3,064 feet. The crew was reaming casing.

In Effingham County, Kingwood Oil Co. and others No. 1 McWhorter, NE SE NW section 15-6n-6e, was drilling at 3,500 feet, in lime. Graham & Duncan No. 1 Ruher, C N half SE NW section 18-6n-7e, was drilling at 1,250 feet.

In Jasper County, Obermyer was drilling at 1,847 feet in No. 1 Atkins, NW NW NE section 3-6n-9e.

In Fayette County, Carter Oil Co. made a location for No. 1 M. Larimore, C SE NE NE section 11-8n-3e. Carter made a location for No. 1 J. G. Main, C E half NE SE section 15-8n-3e.

In Cumberland County, Jolly, Hill and others were drilling at 2,155 feet in No. 1 Jenkins, SE NE NE section 30-10-9e.

In Champaign County, Casey and Edwards No. 1 Mohr, 330 feet from west and 130 feet from south lines of section 9-17n-10e, had a good showing of oil through a hole full of water at a total depth of 496 feet and 4⅞-inch casing was being underreamed. It had a hole full of water at 377 feet, a showing of gas at 480 feet and sand at 486-92 feet. This is the farthest north drilling well in Central Illinois. It is about 100 miles north and east of the Patoka pool, the first of the field discoveries.

In Clinton County, Santa Fe Oil & Gas Co. was rigging up No. 4 Kohlman, SE cor. NE SE section 5-1n-3w. Brookside No. 1 Nothaus estate, NE cor. section 23-2n-2w, a wildcat, spudded and shut down. Kennedy & Blanke No. 1 Eisermier, SE SE NE section 3-2n-5w, a wildcat, was drilling at 300 feet.

In Bond County, Whitehead & Morey No. 1 Poland, NW SE NW section 26-6n-2w, topped Devonian lime at 2,430 feet and was drilling at 3,238 feet.

In Perry County, Amerada Petroleum Corp. No. 1 Pyramid, NW NE NW section 10-6s-3w, was spudded.

In Washington County, Bitterman and others No. 1 Jesse, C SE NE section 16-3s-2w, total depth 1,415 feet, was underreaming casing to 1,344 feet.

In Saline County, C. F. Bolton and others No. 1

Beagle, NW cor. NE section 13-9s-7e, was at a total depth of 1,880 feet, and cleaning out.

In White County, Mazda Oil Corp. No. 1 Mead, NE NE NE section 26-5s-9e, moving in rotary tools.

In Franklin County, Washburn Petroleum Co. No. 1 Neal, C E half SE NE section 6-5s-4e, total depth 2,870 feet, cementing cave.

In Jefferson County, Nollem & Benoist No. 1 Kelly, NE NE NE section 25-4s-2e, had water in Benoist sand at 2,685-2,700 feet and a small showing of oil in lime at 2,791-2,800 feet. The hole filled 1,000 feet with water and 350 feet of oil. The crew will run 5-inch casing. Carter Oil Co. was moving in rotary for No. 1 Cunningham, C W half SW SE section 3-1s-2e. Carter Oil Co. No. 1 Inez Cobb, C W half NW SW section 10-1s-2e, had Benoist sand at 1,953-71 feet and the hole filled 100 feet with oil in 45 minutes. It was then shot with 15 quarts.

In Edwards County, Leach Brothers were trying to shut off cave with the hole at a depth of 3,180 feet in No. 1 Lee, SW NE SE section 11-1s-10e.

OHIO

FINDLAY, Ohio, Apr. 11.—Central Ohio fields yielded six gas wells, four oil wells and three dry holes during the past week.

In Athens County, Rome Township, Gibson No. 2 J. M. Felton, section 30, pumped 10 bbls. of oil the first 24 hours from the first Cow Run sand at 473-87 feet.

In Fairfield County, Berne Township, City Natural Gas Co. No. 2 Charles Carr, section 32, made 200,000 feet of gas from the Clinton sand at 2,043-63 feet.

In Guernsey County, Jefferson Township, Moss & Yaus No. 3 David Gibson, section 7, had 290,000 feet of gas in the Berea sand at 1,283-86 feet. In Washington Township, Jones & Jewell No. 1 P. S. Earnest, section 9, made 730,000 feet of gas from the Berea sand at 1,392-95 feet.

In Jackson County, Washington Township, Keich Brothers No. 1 T. E. Tripp, section 12, had 61,000 feet of gas from the Hamden sand at 774 feet.

In Licking County, Franklin Township, St. Albans Oil & Gas Co. No. 4 J. B. Watson, Lot 11, second quarter, is good for a 5-bbl. pumper in the Berea sand at 684-94 feet. In Perry Township, George Vandergrift and others No. 5 Beulah Weigle, section 16, made 8 bbls. of oil the first day from the Berea sand from 777-87 feet.

In Medina County, Chatham Township, Edson & Co. No. 40 William M. Ripley, Lot 1, Tract 13, found the Berea dry at 400-27 feet. In Chatham Township, Edson & Co. No. 41 William M. Ripley, Lot 1, Tract 13, was drilled to 458 feet. No Berea sand was found.

In Muskingum County, Brush Creek Township, Gas Producing Co. No. 1 Manly McLaughlin, section 10, made 1,360,000 feet of gas from Clinton sand at 4,078-86 feet.

In Stark County, Plain Township, White & Hall No. 1 Nelson Stanbaugh, section 4, had 260,000 feet of gas in the Clinton sand at 4,533-60 feet.

In Washington County, Palmer Township, Swingle No. 38 C. D. Palmer, Lot 1,077, found the first Cow Run sand dry at 585-625 feet. In Salem Township, David Ripley No. 45 Lily Ripley, Lot 41, is a 2-bbl. pumper from the Buell Run sand at 235-45 feet.

Lima Field

The deep test of the Sun Oil Co. in Allen Township, Hancock County, on the J. B. Heimhofer tract in section 21, found the Green sand dry at 1,848-49½ feet, and the top of the St. Peter was found at 1,850 feet. There are no showings as yet. Drilling is being continued.

In Seneca County, Clinton Township, Sun Oil Co. and A. J. West No. 2 A. M. Clouse, section 7, pumped 33 bbls. of oil the first day after the acid treatment of the Green sand. The hole was then drilled 7 feet deeper to total depth of 2,070 feet and shot with 40 quarts. The hole filled up 300 feet in one hour after shot.

EASTERN KENTUCKY OPERATIONS

ASHLAND, Ky., Apr. 11.—Only one completion is included in this week's report of Eastern Kentucky operations. The South Penn Oil Company completed No. 13 on the Adams and Lamberson land in the South Fork district of Powell County, the well starting at 5 barrels of oil daily. In the only other operation reported from that district Wireman Brothers were drilling at 300 feet in No. 4 on the Albert Stewart land.

Other operations by counties are as follows:

In Magoffin County A. V. Hoenig is cleaning out No. 11 on the Green Rice farm in the Wheelersburg district.

In Knott County Inland Gas Corp. was drilling at 690 feet in No. 198 Maryland Beverly land.

In Floyd County Inland Gas Corp. has moved to location of No. 200 on Layne Heirs land on Toms Creek in Floyd County. Kentucky West Virginia Gas Company is still idle at No. 567 on M. Slone & M. D. Slone land on Levisa Fork and was drilling at 1,443 feet, in Big lime, in No. 569, Jeff Jervis land, on Home Branch of Buffalo Creek. The same firm has reached the 743 foot level, in sand, in No. 570, Clarence Neeley land, in same vicinity. The Kentucky West Virginia Gas Company was drilling at 2,475 feet, in shale, in No. 5233, John F. Burchett farm, on Cow Creek.

In Martin County the Kentucky West Virginia Gas Company was pulling casing in No. 5237, C. W. Preece land on Coldwater Fork in Martin County. The same firm is down 825 feet, in slate and shells, in No. 5239 on the same land and is idle at No. 5240, also on the Preece land. The Kentucky West Virginia Gas Company was drilling at 1,105 feet in No. 5238, on M. M. Pratt land, in same locality.

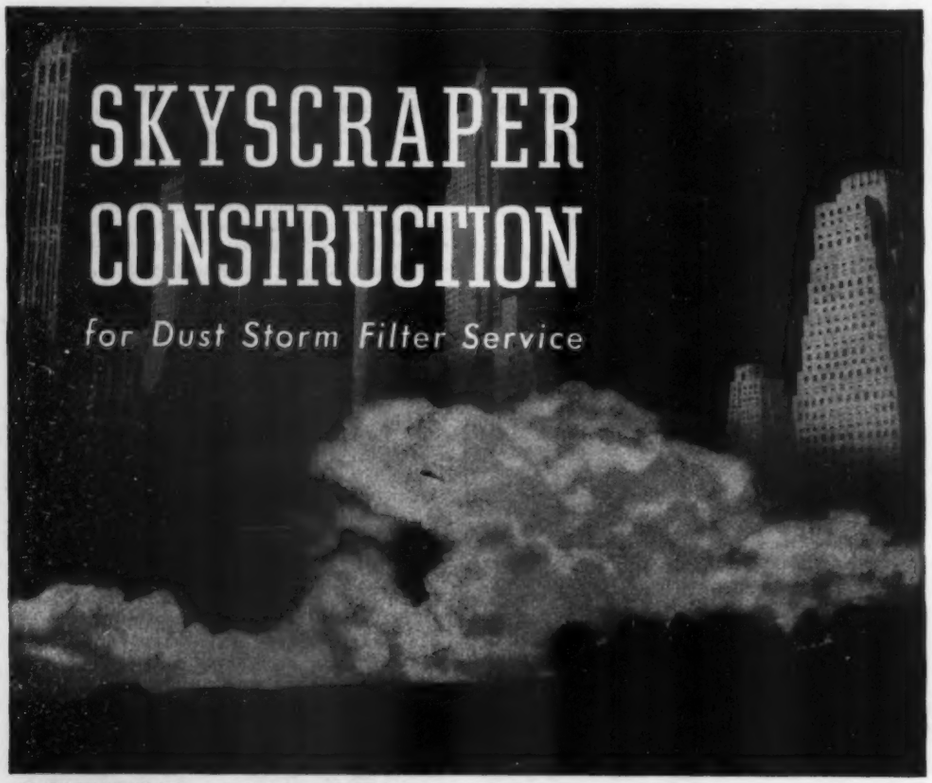
In Pike County Inland Gas Corp. was fishing in No. 196, Helen Leslie land, on Levisa Fork.

WESTERN KENTUCKY

OWENSBORO, Ky., Apr. 11.—Five oil wells and four dry holes was the completion record of the week in Western Kentucky. A 60-bbl. well from Jett sand was the best of the week's crop. Completions and new operations by county were as follows:

Breckinridge County, Cloverport district, Flesher Galey and others No. 1 J. W. White, moving in; Tar Springs district, William Rollins No. 1 Acos Brothers, deep test, drilling at 850 feet.

Butler County, Tilford district, J. C. Miller, trustee, and others No. 1 Minnie Embry, deep test, drilling at 650 feet; Rochester district, Frank Bernier No. 2 Kyle Willis, drilled 23 feet more of Jett sand, making a total of 36 feet of Jett sand, from 812-48 feet. The shot burst the 4½-inch casing.



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Henderson County, Hamilton Ferry district, Hoosier Drilling Co. No. 1 C. T. Blackwell, deep test, drilling at 1,679 feet.

McLean County, North Livermore district, Jack Cox and others No. 3 D. A. Bennett, dry hole, Bethel sand at 1,109-30 feet; total depth 1,166 feet; Maxwell district, J. C. Ellis and others No. 4 John Ditto heirs, 20 bbls., Stray sand at 961-84 feet, total depth 999 feet; Island district, South Penn Oil Co. No. 4 Alma Nall, 60 bbls., Jett sand 1,467-86 feet, total depth 1,489 feet; Hume, Steel & Early No. 1 Robert Nall, dry hole, total depth 1,715 feet, 9 bbls. water per hour from Jones sand.

Muhlenberg County, Paradise district, South Penn Oil Co. No. 3 Rogers Crescent Coal Co., spudding in.

Ohio County, Adaburg district, Nollem Oil & Gas Co. No. 5 Vincent Crowe, 15 bbls., Jett sand at 623-36 feet, total depth 645 feet, shot with 60 quarts; Leper Oil Co. No. 2 Flem Douthitt, 25 bbls., Lower Jett sand 751-67 feet, shot with 60 quarts, total depth 779 feet; Buford district, Edwards & Gregory No. 1 Albert Taylor, spudding in; Heflin district, Callas & Stevenson No. 1 L. B. Shaver, moving in; Callas & Boling No. 5 Mrs. J. Simmerman, an old gas well, drilled deeper through Bethel sand, total depth 1,557 feet, plugged; Dundee district, Charles Marsh and others No. 5 Mrs. J. C. Nabors, dry hole, Barlow sand at 718-30 feet, total depth 735 feet; Friendship Church district, A. Teller and others No. 5 Coy Medcalf, 25 bbls., Barlow sand 571-84 feet, shot with 60 quarts, total depth 588 feet; A. Teller and others No. 14 A. A. Whitehouse, spudding in; Barney Calvert No. 7 R. P. Kelly, rigging up.

General Markham to Address West Virginia Petroleum Men

The growing burden of taxation on the petroleum industry and its products, now standing at more than $1,000,000,000 annually in the United States, will be discussed by Gen. Baird H. Markham, of New York, director of the American Petroleum Industries Committee, at the annual convention of the West Virginia Petroleum Association, April 29, at the Daniel Boone Hotel, Charleston.

Alberta Marketing Inquiry Is Postponed Indefinitely

OTTAWA, Ontario.—The investigation by the Federal Tariff Board into the Turner Valley crude marketing problem, scheduled to resume here on April 4, has been postponed indefinitely. When the board adjourned on February 14 it was announced that representatives of the Alberta Petroleum Producers Association would negotiate with the railroads regarding freight rates on Alberta crude to the head of the lakes, and with eastern Canadian refiners concerning the use of Alberta crude. These negotiations are still in progress.

Michigan Safety Conference

Michigan statewide safety conference will be held at the Hotel Statler, Detroit, May 23-25.

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Michigan Field Report

By
O. C. PRESSPRICH

Allegan County Adds a Pool to Its Six Recent Discoveries

SAGINAW, Mich., Apr. 11.—Allegan County claimed a large slice of the petroleum spotlight in Michigan the past week, shifting attention to southwestern Michigan from Midland County's Edenville pool.

Allegan's seventh recent discovery test in the county was Muskegon Development Co. No. 1 William Swanders, NW SE SW section 9-3n-13w, reported to have developed an acidized production of 1,000 bbls. daily. The test is an offset to Sim B. Hood No. 1 Wright wildcat, discovery well in the sector, an estimated 500-bbl. producer. Considerable interest has been shown by operators with the Swanders test said to confirm a new Allegan field.

As interest in Allegan County soared, reaction set in at Edenville's field. Disappointment over development of confirmation tests caused figurative question marks to appear on future possibilities of the field.

Michigan Crude Oil Runs

Daily average for March, 1938

Pool—	Wells	Runs
Porter-Yost	421	7,670
Greendale-Chippewa	258	1,901
Geneva-Midland	3	15
Edenville	2	275
Vernon-Leaton-Denver	94	1,255
Sherman-Isabella	59	4,298
Montcalm County	80	872
Beaverton	23	284
Bentley-Gladwin	7	367
Buckeye-Wicklund-Oard	379	25,811
Secord-Gladwin	2	21
Ogemaw	214	3,448
Adams-Arenac	8	126
Clayton-Arenac	40	2,091
Saginaw-Hemlock	57	28
Birch Run	25	64
Dundee-Monroe	3	22
Allegan County	70	3,630
Muskegon	91	148
Total	1,836	52,326

Mammoth Producing & Refining Corp. ran into unexpected trouble while acid testing at its No. 1 Higgins, north offset to Chapman Oil Co.'s discovery well, and further testing was delayed. From indications, however, it appeared likely that Mammoth's north offset would be little more than a small producer in comparison with Chapman's discovery or Mammoth's west offset, 1-A State. Another Mammoth test—a south offset to Smith Petroleum Co.'s failure—was drilling at approximately 2,500 feet and was due to provide conclusive information of the productive strata north of the discovery well. Should this well prove unproductive it probably will result in abandonment of efforts to explore the area north of the discovery, operators declare. The two Mammoth-Higgins tests and Smith Petroleum Co.'s failure all within a quarter of a mile north of the discovery would set up a boundary marker of the field in that direction, while 1½ miles to the south, on the north border of Jerome Township, Sun Oil Co.'s dry hole limits the Edenville field in that direction. Operators say that development will swing west of the discovery, while several wells drilling eastward are due to sample structures in that area.

Another picture is presented by Allegan County development, which has been steady and is spread over several townships. With activity in Monterey, Otsego, Salem, Allegan, Trowbridge and Dorr townships, all having found some productive structures, operators are more than mildly interested. Interest in Monterey Township, some 12 miles to the northwest of the recent Otsego strike, and about 4 miles to the south of the highly productive Salem field, soared with this week's developments at Muskegon Development Co.'s 1,000-bbl. producer, confirmation test in the sector. Another nearby well expected to be brought into production momentarily was J. W. McIntosh No. 1 Dalrymple, NE NW NW section 16-3n-13w, two locations south of Hood's discovery well in the area. It is scheduled as the third test to sample structures in the township. Several others are drilling at various depths.

Earlier in the week Crystal Syndicate, Inc., No. 1 Jewell, NW NW NE section 3-1n-12w, a wildcat, struck pay in the lower Traverse, and was acid treated to a production of 200 bbls. daily. This strike spread the productive area of Allegan County over the entire eastern part of the county, and considerable activity was expected to result.

In Salem Township two dry holes were reported. They were L. W. Lamb No. 1 Clark, SE SE SE section 16-4n-13w, and Cecil Runyan, Inc., No. 1 Gottlieb-Miller, NE SE NW section 17-4n-13w, both dry in the Traverse.

The addition of wildcat production in Allegan has spurred activity in the territory with Dorr, Monterey and Salem townships being prominently represented in this week's permit lists. Dorr and Monterey townships each have two permits and Salem has three.

Gladwin County—Tobacco Township

Frank V. McCollister No. 1 McMahon, NW NE NW section 1-17n-1w, a south extension of the South (Oard) Buckeye field in section 36, was rated a 40-bbl. producer after acid. Two dry tests are nearby.

Gladwin County—Buckeye Township

Restricted development in Buckeye Township relaxed somewhat this week, although the usual production pace was not expected to reach normal for some weeks, due to weather conditions. Three oil wells were added to the field. Sun Oil Co. continued to develop its polific Strohkirk lease with its No. 10, NW NW NE section 9-18n-1w, which developed an acidized production of 500 bbls. daily. Cryden & Rowmor Corp. No. 6 Shaffer, SE NE SW section 12-18n-1w, was a 50-bbl. natural producer, and was scheduled for acid. Robert L. Tope No. 6 Ludwig-Buehler, SW NW NE section 26-18n-1w, failed to improve its flow after acid, and still was rated as a 150-bbl. producer. Kirkham-Kales Co. No. 3-C State, SE SE SE section 22-18n-1w, acidized as a 100-bbl. daily producer in the so-called Midway field.

Gladwin County—Bentley Township

Revived interest was apparent in Bentley Township the past week, with three average producers added to the field, headed by Gordon Oil Co. No. 1-E State, NW NW NW section 28-17n-2e, a 200-bbl. well after acid. The test was one of the best in the area in recent weeks. It is in the heart of proved territory. Bentley Oil Co. No. 4-A State, SW SE NE section 20, was deepened 20 feet, resulting in doubling the natural flow to an estimated 100 bbls. J. V. Wicklund Development Co. No. 4 Wright, NW NE NE section 28, was placed on pump and gauged 20 bbls. daily.

Gladwin County—Sage Township

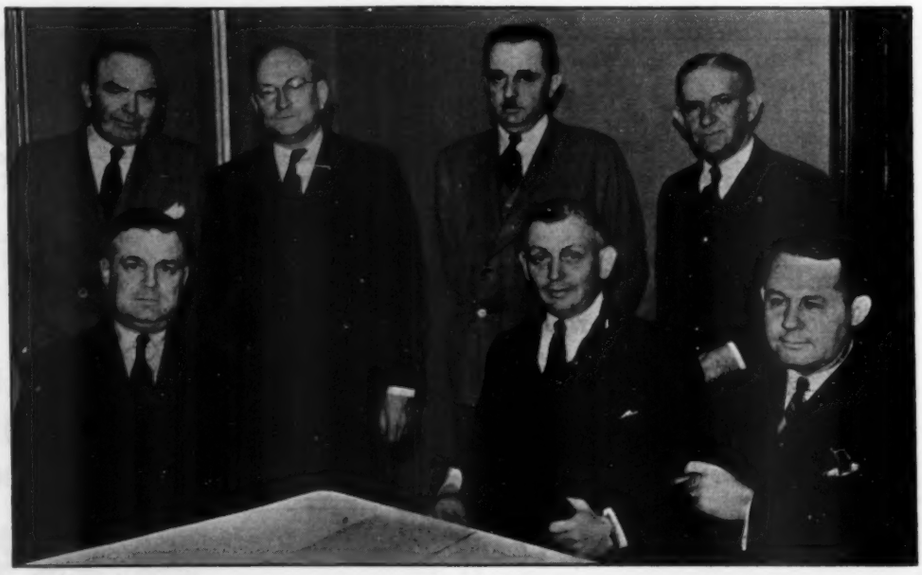
The one active test in Sage Township testing the Dundee structure was declared dry and will be abandoned. It was McClanahan Oil Co. No. 1 Sharp, SW SW SW section 9-19n-2w, which failed to make a showing. Structure was reported low.

Clare County—Sheridan Township

Big Basin Oil & Gas Co. No. 1 Rilett & Murphy, NW NW SE section 26-17n-3w, offset test to Gulf Refining Co.'s Grant Township 14,000,000-foot gasser, was on top of the Dundee limestone late last week. The test is being closely watched as indications of a possible commercial field in Clare County.

(Continued on Page 229)

NORTH LOUISIANA DIVISION I. P. A. A. MEETING



At a recent division meeting of the Independent Petroleum Association of America, 40 independent producers of North Louisiana heard H. B. Fell, executive vice president. Among the national and divisional officers present were: Seated, Charles Van Vleck, field manager; H. B. Fell, executive vice president, and B. A. Hardy, vice president for North Louisiana; standing, R. J. O'Brien, L. M. Moffitt, A. C. Glassell, Sr., and W. C. Wolfe, directors of the North Louisiana division.

West, Central and Panhandle Texas

By MITCHELL TUCKER

Major Extension to Church-Fields Area or a New Pool

FORT WORTH, Tex., Apr. 11.—A major extension or new field north of the Church-Fields area in northeastern Crane County is indicated by Magnolia Petroleum Co. No. 1 University, section 16, Block 30, University Lands. The wildcat well logged gas from 3,197-3,233 feet and increases in gas and oil from 3,244 feet to total depth, 3,258 feet, in Permian lime. A commercial well here will either provide a 3½-mile northern extension to the 10-mile Church-Fields-McElroy field, or open a new pool to the north of the trend on the east side of the basin platform.

Goldsmith Pool

Among the three new locations made on their 31-section Goldsmith ranch in Ector County, Gulf Oil Corp. plans a one-half mile outpost. Nos. 94, 95 and 96 are the new wells which will be started soon. Gulf added two new completions on the Goldsmith ranch last week, No. 80 flowing 888 bbls. per day from 4,100-95 feet, and No. 85 flowing 1,168 bbls. initially from 4,178-4,200 feet.

Jordan Pool

The Jordan field of southern Ector County is receiving a south and northwestern outpost producer to extend its continually expanding limits. One location south of production, Atlantic Refining Co. No. 2-A Utex, flowed 754 bbls. in 2½ hours through drill stem on preliminary test. One-half mile west of production at the northern end of the field, Joe A. Worsham No. 2 Connell is also in the testing stage, after flowing about 300 bbls. into pits during the first three hours after shot with 400 quarts from 3,400-3,630 feet.

Also in Ector County, the Foster pool's productive limits were pushed one-half mile southwest by Stanolind Oil & Gas Co.'s completion of No. 9-B Cowden, flowing 1,555 bbls. in 24 hours on official gauge.

Harper Extension

Attention has been directed to a possible 2-mile extension to the active Harper pool of Ector County, south of the west edge of production. Sinclair Prairie Oil Co., Argo Oil Corp., and York & Harper, Inc., No. 1 Paul Moss, logged attractive oil showings in the Permian from 3,890 to 3,898 feet. The well is also about 2 miles northeast of Penwell field, and it is the opinion of some that a new intermediate small structure has been found, rather than an extension to present areas.

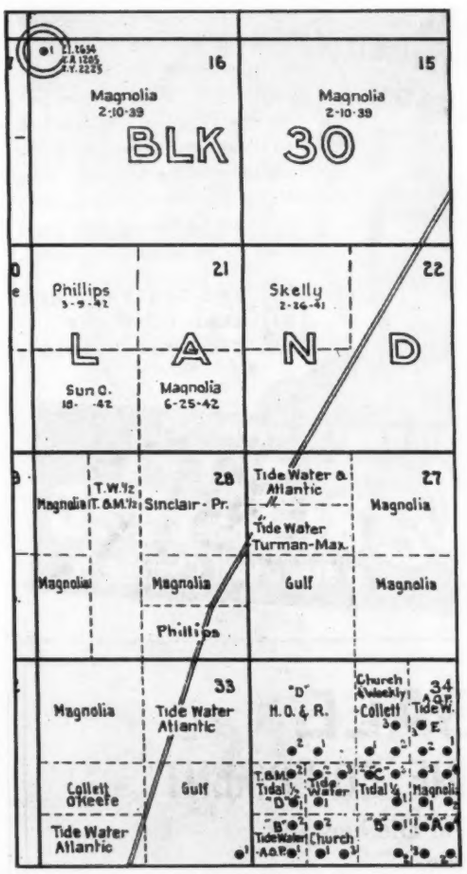
North Permian Basin

North basin wildcats share largely in present wildcat interest. In northwestern Terry County, Larry E. Hultz No. 1 Ross-Gulf is drilling below 2,400 feet as a possible 3-mile southwest extension to the Slaughter field of Hockley County. Status of Gulf Oil Corp.'s two attempts at southwest and southeast extensions to the latter field remain unchanged from last week's reports, as both wells are awaiting cement to set after plugging back to shut off water.

In northeast Garza County, Gulf Oil Corp.'s 8,500-foot test on the Swenson ranch, H.&G.N. Survey, is drilling below 3,400 feet.

Andrews County is dotted with six important wildcats. Three are trying to open a field about 6 miles west of the Fuhrman pool, where Seaboard's No. 1 Munger and Nix is still testing and swabbing about 50 bbls. per day. Another is testing the territory 3 miles west of the Means field, and the sixth is immediately north of Shafter Lake. Most recent of Andrews County wildcats was announced as Atlantic Refining Co. No. 1 Texas Co.-University Lands, section 26, Block 11, University Survey. Location is about 5 miles north of production in the immense Goldsmith field of northern Ector County, and was made attractive by a heavy gas showing found in the Yates sand while drilling a "thin hole" with core drill on the structure.

In Yoakum County, Gulf's attempt to make a commercial producer at No. 1 Dixon, situated about midway between the Bohago and Bennett fields, remains in the testing stage with no important developments reported. Southwest of Plains in the same county, Magnolia Petroleum Co. No. 1 Webb, is circulating to



Southwest Mapping Co., Fort Worth

Location of Magnolia's possible 3-mile northern extension to the Church-Fields-McElroy area in northern Crane County, Texas

free stuck drill stem at 5,077 feet. Gulf States No. 1 Graham, wildcat 7 miles northeast of Plains is setting surface pipe.

A new Permian lime producing "spot" in eastern Pecos County was indicated last week, about 4 miles west of the Yates pool. Cardinal Oil Co. No. 1-36 White and Baker flowed 20 bbls. of 29-gravity oil in seven hours on initial tests, with about 400,000 feet of gas, total depth 1,639 feet, plugged back from 1,802 feet. Location is near the present White and Baker area, and may prove to link together one or more of the small producing areas west of Yates.

WEST CENTRAL TEXAS

Fisher County

Shell Petroleum Corp. has let contract for a 4,000-foot test on its 12,000-acre Claytonville block in southwestern Fisher County, 2 miles north of Captolia. This block was assembled in 1934 and has been intensely seismographed and core drilled.

Three miles south of the Rotan field, Daube Brothers and Forest Development Corp. are preparing to drill No. 1 Bennett, contracted to a total depth of 4,500 feet.

One completion was added to the inactive Rotan field, General Crude Oil Co. No. 3 Morrow, gauging 386 bbls. naturally from 3,513-35 feet. The only remaining active location in the field is Lewis Production Co. No. 6 Preston, rigging up to drill.

Jones County

In southwestern Jones County, Humble Oil & Refining Co.'s promising wildcat east of the old Noodle Creek field, No. 1 I. N. Irwin, plugged back with cement in an attempt to shut off bottom-hole water, but has been delayed by weather conditions in rigging up a spudder for cleaning out operations. Previously, on a three-hour swabbing test through tubing, 18 bbls. of oil and 72 bbls. of water were recovered, and the hole was plugged back to 2,667 feet.

Between the Centerline and Lewis pools in Jones County, Shaheen Oil and Big Six Oil companies spudded No. 1 P. L. Telford as a semiwildcat.

The Lewis pool, producing from the Bluff Creek sand at 1,930 feet, was officially a year old this week. Of the 16 completions in the field, average initial potentials have been 448 bbls. daily, indicating Lewis as the most prolific West Central Texas field to produce from the Bluff Creek sand.

PANHANDLE DISTRICT

Sixteen new locations and eight completions sum up the Panhandle activity for the week. All eight completions were in the oil territory, having a combined potential of 3,878 bbls.

There are now 3,807 producing oil wells in the Panhandle district, last week having an average daily production of 15.1 bbls., and a total production of 57,590 bbls. daily.

Panhandle operators will watch closely the proposed deep Ordovician test in Cimarron County, Oklahoma, just north of the Texas line, as Barnsdall Oil Co. is moving in for the drilling of their No. 1 School Land, section 35-5n-5ecm. The I.T.I.O. Co. No. 1 Davis in Sherman County, Texas, finding about 25,000,000 feet of gas at 3,100 feet, has indicated a regional structure northward from the Panhandle field in Moore and Hutchinson County through the Oklahoma Panhandle. As a consequence, all available acreage in northwestern Texas Panhandle is being put under lease for possible later exploration.

Hall County

In the southeastern corner of the Panhandle, Hall County, Jacobs-Hanner No. 1 test, three-quarters of a mile west of Turkey, reported some saturation at 1,475-85 feet, but continues drilling below 1,571 feet. If expected shallow pay is not found above 2,000 feet, the well may go to a depth of 4,000 feet before plugging back for tests of upper oil showings.

Gray County

The Lone Star Gas Co.'s wildcat in southeastern Gray County, No. 1 Fowler, section 118, Block 23, H.&G.N. Survey, came to the front after logging attractive sprays of oil. Originally thought to have opened a new gas producing area in the Granite Wash, this well began flowing about 25,000,000 feet of gas. When cut back to about half its potential flow, the well began spraying considerable quantities of oil. Testing continues in an effort to increase the oil flow.

(Continued on Next Page)

WEST TEXAS COMPLETIONS

(24-hour gauges)

Andrews County

Humble Oil & Refining Co. No. 38 J. S. Means, 4,500-50 feet, 74 bbls.; No. 40 J. S. Means, 4,500-36 feet, 427 bbls. Fuhrman Petroleum Co. No. 8 Ford, 4,245-4,449 feet, 1,958 bbls.

Crane County

E. P. Cravens No. 1 Hughes, 2,285-2,345 feet, 125 bbls. Loffland Brothers No. 1 Riedland, junked and abandoned at 5,434 feet.

Crockett County

Pitzer & West No. 1 Hoover, 2,038-67 feet, 10 bbls.

Ector County

Continental Oil No. 3 T. & P. Land Trust, 4,050-4,175 feet, 2,310 bbls. E. E. Foggelson No. 6-B University, 3,310-3,601 feet, 720 bbls. Gulf Oil Corp. No. 80 Goldsmith, 4,100-95 feet, 888 bbls.; No. 85 Goldsmith, 4,178-4,200 feet, 1,168 bbls. Lee Drlg. Co. No. 1 T. & P. Land Trust, 4,055-4,175 feet, 2,107 bbls. M.B.K. Drilling Co. No. 1-C H. C. Foster, 4,215-4,310 feet, 400 bbls. Mid-Continent No. 6 Cowden, 4,035-4,167 feet, 1,465 bbls. Shell Petroleum Corp. No. 10-B Cowden, 4,030-4,225 feet, 761 bbls. Sinclair Prairie No. 5 Johnson, 4,183-4,260 feet, 528 bbls.

Howard County

Illinois Oil No. 4 Jones, 2,612-3,005 feet, 198 bbls. Lockhart Oil No. 1 Hussinger, 2,702-2,875 feet, 963 bbls.

Menard County

G. A. Clements No. 1 Murchinson, dry and abandoned at 1,298 feet.

Fisher County

General Crude No. 3 Morrow, 3,513-35 feet, 386 bbls.

Pecos County

Arnold Oil No. 1 Scharff-Blackman, 1,800-34 feet, 671 bbls. E. P. Cravens No. 1 Trees, abandoned at 2,273 feet. Lee Petroleum No. 19 University, 1,650-60 feet, 97 bbls. Superior Oil No. 2 Raillinger, dry and abandoned at 2,352 feet.

Upton County

Basin Oil No. 8-B Baker, 2,200-43 feet, 1,153 bbls. British American Oil Co. No. 10 Robbins, 2,282-2,308 feet, 483 bbls. Homestead Oil & Gas No. 1 Starnes-Fowler, temporarily abandoned at 780 feet. Humble Oil & Refining Co. No. 16-B Ricker, 2,340-55 feet, 341 bbls. Texas Pacific Coal & Oil No. 32-A Lano, 2,200-14 feet, 569 bbls.

Ward County

Gulf Oil Corp. No. 84 Estes, 2,519-2,940 feet, 1,127 bbls. Humble Oil & Refining Co. No. 35 Richter, 2,853-2,933 feet, 1,060 bbls. West Texas Oil & Royalty Co. No. 3-C University, location temporarily abandoned.

Winkler County

Gulf Oil Corp. No. 65 Daugherty, 2,820-3,025 feet, 486 bbls. Humble Oil & Refining Co. No. 23-C Walton, 3,095-3,105 feet, 540 bbls. Bill Little No. 4 Walton, location temporarily abandoned. Magnolia Petroleum Co. No. 140 Walton, 2,818-2,934 feet, 476 bbls.; No. 144 Walton, 2,828-2,930 feet, 1,510 bbls.

Yoakum County

J. W. Murchison No. 2 Elliot, 4,855-5,070 feet, 310 bbls. Shell Petroleum Corp. No. 1-D Baumgart, 4,835-5,005 feet, 348 bbls.

PANHANDLE COMPLETIONS

(24-hour gauges)

Gray County

Gulf Oil Corp. No. 12 Barrett, 3,184-3,290 feet, 540 bbls. Sinclair Prairie No. 10 Leycomb, 2,840-2,956 feet, 90 bbls. Texas Co. No. 27 Saunders, 2,777-2,850 feet, 628 bbls. Kewanee Oil & Gas Co. No. 15 Morgan, 3,198-3,238 feet, 628 bbls. McIlroy Oil Co. No. 2 Leopold, 3,263-92 feet, 306 bbls. Shamrock Oil & Gas Co. No. 6 Big-Gray Saunders, 3,070-89 feet, 3,097 bbls.

Hutchinson County

Gulf Oil Corp. No. 79 Dial, 2,995-3,040 feet, 429 bbls. Cree & Hoover and Dye No. 3 Harvey Sisters, 2,980-3,030 feet, 532 bbls.

WEST CENTRAL TEXAS COMPLETIONS

Jones County

Petroleum Producers No. 4 Jessie S. Milsap and others, flowed 284 bbls. in 24 hours after 40-quart shot in sand at 1,931-45 feet, total depth, Lewis pool. F. A. Gillespie & Sons No. 1 J. N. Hatfield, abandoned dry at 3,005 feet, total depth. R. H. Roark and others No. 2 W. W. Toombs, abandoned dry at 2,821 feet, total depth. Sinclair Prairie No. 4-B Bertha King, pumped 92 bbls. in 24 hours after 2,000-gallon acidization at 2,134-66 feet. Condor Petroleum Co. No. 15 Henry Sayles, flowed 409 bbls. in 24 hours from natural sand at 1,976½-84 feet, total depth. Fain-McGaha and Sinclair Prairie No. 1 Mrs. Annie May Lyckman, flowed 667 bbls. in eight hours from natural lime at 3,221-33 feet, total depth.

Shackelford County

Poly Oil Corp. No. 12 Spears and others, 26 bbls. pumping from 722-33 feet, pumping.

Danciger Oil & Refineries No. 2 J. E. McCown, flowed 489 bbls. in 17 hours after 1,000-gallon acidization from 3,189 to 3,212 feet, total depth.

Ungren & Frazier No. 1 B. C. Harvey, 55 bbls. pumping daily from natural sand at 1,696 to 1,706 feet, total depth.

J. L. McMurray Heirs No. 5 J. B. Matthews, abandoned dry at 1,050 feet, total depth.

R. C. Parker No. 1 J. S. Smalley, abandoned dry at 1,202 feet, total depth.

Fisher County

Montour Production No. 5 E. Smith, pumped 409 bbls. in 24 hours from 3,571-84 feet, total depth.

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Miscellaneous small pipe line equipment.

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HOPE ENGINEERING COMPANY
MOUNT VERNON, OHIO

Rocky Mountain Runs

(Continued from Page 217)

Texas Co. No. 1 Lindquist, C SE SE sec. 17-32n-5w. T. D. 2,705 ft.; fsg.
A. B. Cobb No. 1 State, C NE NE sec. 30-37n-4w. T.D. 2,592 ft.; S.D. until spring.
Santa Rita O. & G. Co. No. 3 Govt., C SW SW sec. 4-32n-5w. Drlg. 2,800 ft.

Hill County

Burton & Hole No. 1 Waldrip, C SW NW sec. 12-32n-17e. Drlg. 631 ft.

Judith Basin County

Fletcher E. Hunt No. 3, NW SE NE sec. 30-14n-15e, Drlg. 1,875 ft.

Lewis and Clark County

Lewis & Clark Oil Synd. No. 1 Heilman, NW NW SW sec. 11-18n-5w. Drlg. 2,461 ft.

Park County

Ben W. Ryan No. 1 Burgee, SE SW NW sec. 28-2s-11e. Drlg. 1,278 ft.

Toole County

There was one completion in the Kevin-Sunburst Field in the Superior Oil Co. No. 7-A Government, NE NW NW section 12-35n-3w, which swabbed 160 bbls. per day at 1,597 feet from the Sunburst sand at 1,582-95 feet.

The Builders Oil Co. No. 2 Ward, SW SE NE section 29-35n-3w, which was reported a completion last week under the name of former operator, Welch Brothers, is making 80 bbls. per day on the pump with very little water.

Chas. Grant et al No. 1 Anderson, SE NE NE sec. 26-35n-4w. T.D. 2,107 ft.; top Sunburst 1,847 ft.; may acid.
H. C. Morton No. 8 Morton, C SW NW sec. 24-34-2w. S.D. 590 ft. acct. storm.
Big West Oil Co. No. 7 Gunderson, CWL NE NW sec. 19-35n-2w. S.D. 1,320 ft.; storm.
R. G. Parrent No. 1 Anderson, C SW SE sec. 26-35n-4w. T.D. 2,034 ft.; S.O. in lime break at 2,027-34 ft.; acid failed to respond; will acid again.
West Kevin Community Lease, Inc., No. 1 McClary, SW NE NW sec. 3-34n-4w. T.D. 1,800 ft.; prep. to run csg.

Yellowstone County

Broadview Dome Oil Co. No. 1 Stallinberger, NE NE SW sec. 18-3n-23e. S.D. 4,565 ft.
Riverton Oil Co. No. 1 Fox, CEL NW NE sec. 14-2n-23e. T.D. 1,795 ft.; cmtd. 8¼-in. on bttm.; W.O.C.

UTAH

Grand County

Utah Southern Oil Co. No. 1 Hyde, SE NW NW sec. 33-22s-22e. T.D. 6,715 ft.
Columbia Crude Corp. No. 1 Rath, NW SW SE sec. 12-25s-20e. S.D. 3,500 ft. for repairs.
Cane Creek Oil Co. No. 1 Govt., NW SW 31-26n-21e. Drlg. below 1,200 ft.
Crescent Eagle Oil Co. No. 1 SW SE sec. 4-22s-21e. O.W.D.D.; old T.D. 4,006 ft.; R.U. to go to 6,000 ft.

Summit County

Longwell Pet. Co. No. 1, SE SW SE sec. 35-3n-5e. Drlg. 2,650 ft.

NEBRASKA

Sioux County

Union Oil Co. of Calif. No. 1 Cook, SE cor. sec. 15-28n-55w. M.I.M.

Michigan Fields

(Continued from Page 226)

Isabella County—Nottawa Township

Wicklund Development Co. No. 1 Lawens, NW SW SE section 24-15n-5w, only active test in Nottawa, will be abandoned as a dry test. Nottawa Township at one time gave promise as a commercial field.

Bay County—Gibson Township

After testing for more than a week after a slight show of oil, C. W. Teater No. 1 Goodman, SE SW SW section 28-18n-3e, will be abandoned as dry.

Ogemaw County—Churchill Township

A small commercial producer was added to the Ogemaw field when H. C. Nelson No. 8 State, NE SW SW section 31-22n-3e, rated 60 bbls. daily after acid.

Southwest Texas Fields

(Continued from Page 220)

McMullen County

Ezzell field: Harry Ezzell No. 3-C fee, 1,484 feet, perforated casing 1,443-47 feet, 157 bbls., pumping. Harry Ezzell No. 4-C Ezzell, 1,461 feet, perforated casing 1,443-47 feet, 157 bbls., pumping. Harry Ezzell No. 4-C Ezzell, 1,461 feet, gas well.

Nueces County

Luby field: Seaboard Oil Corp. No. 16 Luby, 5,074 feet, perforated casing 5,065-72½ feet, 160 bbls., ¼-inch choke. Richard King field: Southern Minerals Corp. No. 6 King, 4,023 feet, perforated casing 4,019-21 feet, 25 bbls., 7/64-inch choke. Saxet field: Andrade and others No. 9 Frank, 6,921 feet, 133 bbls., 9/64-inch choke. Barnsdall Oil Co. No. 6 Humphries, 4,873 feet, perforated casing 4,723-27 feet, 5 bbls. per hour, 9/64-inch choke. Tom Graham No. 6 Harmon, 6,949 feet, 300 bbls. fluid, 20 per cent oil, balance salt water. Daniel McGahey No. 4 Coyd, 4,172 feet, perforated casing 4,146-58 feet, 238 bbls., ⅞-inch choke. West Saxet field: Heep Oil Co. No. 1 McKinzie, 5,821 feet, perforated casing 5,818-21 feet, 150 bbls. 12 hours, ⅞-inch choke. Phillips Petroleum Co. No. 1 M. B. Clark, 5,830 feet, perforated casing 5,823-25 feet, 9 bbls. per hour, ⅛-inch choke. Rutherford Drilling Corp. No. 1 McKenzie, 5,814 feet, perforated casing 5,806-11 feet, 5 bbls., ¾-inch choke.

Milam County

Minerva-Rockdale field: W. A. Jones No. 3 Coffield, 682 feet, 5 bbls. per day, pumping.

San Patricio County

East White Point field: C. E. Smith No. 1 French, 5,717 feet, abandoned.

Webb County

Carolina Tex field: C. H. Lewis No. 1 Garza, 2,692 feet, abandoned. Oilton field: M. E. Brooks No. 3 Uzzell, 2,008 feet, 5 bbls. per hour, pumping. Coffield & Lanning No. 2 Sullivan, 2,029 feet, abandoned. Oil Well Drilling Co. No. 2 Garcia, 2,010 feet, perforated casing 1,982-91 feet, 3 bbls. per hour, pumping.

Williamson County

Byersville field: Ben Pearce No. 6 Mattick, 911 feet, 25 bbls., pumping.

Victoria County

McFaddin field: Barnsdall Oil Co. No. 6 McFaddin, 4,401 feet, 105 bbls., 7/64-inch choke.

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California Field Report

By
L. P. STOCKMAN

Find Oil Sand in Turk Area Starting Busy Leasing Play

LOS ANGELES, Calif., Apr. 11.—The Turk area of Fresno County, located about midway between the western end of the Kettleman North Dome field and the southeastern end of the East Coalinga field, has become the hottest spot in California as a result of oil sand cored in No. 2 Gatchell, in section 18-20-16, by Petroleum Securities Co., and leases are being taken in all directions for a distance of 5 miles. No. 2 Gatchell is a mile southeast of the nose of the East Coalinga field and it may either mean the discovery of a new field or an extension to the Coalinga field. This wildcat logged top of the Avenal zone of Eocene age at 6,710 feet, and bottom of the hole is at 6,880 feet. After coring into the oil sand a string of 9⅝-inch casing was cemented at 6,765 feet. Due to the overproduction situation the company may wait two or three months before making a test. It is doubtful if other operators will start a new well until Petroleum Securities has made a test. Standard Oil Co., which owns every alternate section of land acquired from Southern Pacific Railroad Co. will be the largest gainer if substantial production is developed in No. 2 Gatchell. Southeast of this well Petroleum Securities and Dana Hogan drilled wildcats in section 28-20-16 to 7,383 feet and 6,605 feet respectively but failed to develop production. No. 2 Gatchell and the two wildcats drilled by Petroleum Securities and Hogan are located on the Coalinga anticline which is believed to be the northern extension of the Kettleman Hills anticline, and for this reason the area is receiving more than passing attention. It is the present opinion that the wildcats drilled southeast of No. 2 Gatchell were not carried deep enough to prove conclusive tests, as the formation is dipping quite rapidly to the southeast until in the western end of the Kettleman North Dome field the Avenal zone is buried beneath more than 10,000 feet of Pliocene and Miocene rocks. The area in which No. 2 Gatchell is being drilled is one of the most interesting districts in the state from a geological standpoint because production in the Coalinga field has been found in the Miocene and Cretaceous, with production developed in a normal anticline, a monocline and a syncline. Because of the Cretaceous production, although small, there is a possibility that the Cretaceous may ultimately be found productive in the Kettleman North Dome field as well as in the East Coalinga anticline and in the area between these two districts.

Wilmington

Eight new wells which registered an aggregate initial daily production of 14,715 bbls. were completed in the Wilmington field of the Los Angeles Basin during the week. Bankline Oil Co. finished the largest well, No. 4 Union Pacific, flowing 4,470 bbls. per day from 3,895 feet. This well, producing from three zones, was finished with 999 feet of 8⅝-inch liner carrying perforations at 2,378-2,440 feet, 2,530-2,620 feet and at 2,856-3,336 feet and 559 feet of 6⅝-inch liner carrying perforations from 3,377 feet to 3,890 feet. All of the perforations were of 80-mesh and the cement job was through perforations at 2,851 feet and 3,372 feet. Production of the Ranger zone which tests 17.9 degrees is flowing through an 8/64-inch bean while production of the upper Terminal zone testing 22.4 degrees is flowing through a 36/64-inch bean and production of the lower Terminal zone testing 26.5 degrees is flowing through a 60/64-inch bean. The Ranger zone was shut in immediately after completion at which time production of the upper and lower Terminal zone was reduced to 2,500 bbls. and then cut back to the present allowable maximum of 1,000 bbls. daily.

Superior Oil Co. completed two wells in the Ranger zone. No. 4-C Seaside was finished flowing 550 bbls. of clean 18.1-gravity oil daily from 2,774 feet and the No. 1 Leonard, 596 bbls. of 17.9-gravity oil daily from 2,896 feet. No. 4-C Seaside was completed through a 20/64-inch bean while No. 1 Leonard was brought in flowing through a 24/64-inch bean. The Termo Co. completed No. 1-D Long Beach Harbor Department, flowing 3,190 bbls. of 27.2-gravity oil per day from the Terminal zone at 3,905 feet. This well was finished with 1,590 feet of 8⅝-inch liner landed on bottom and carrying perforations at 2,910-3,370 feet and at 3,405-3,905 feet and was cemented through perforations at 2,905 feet and 3,400 feet.

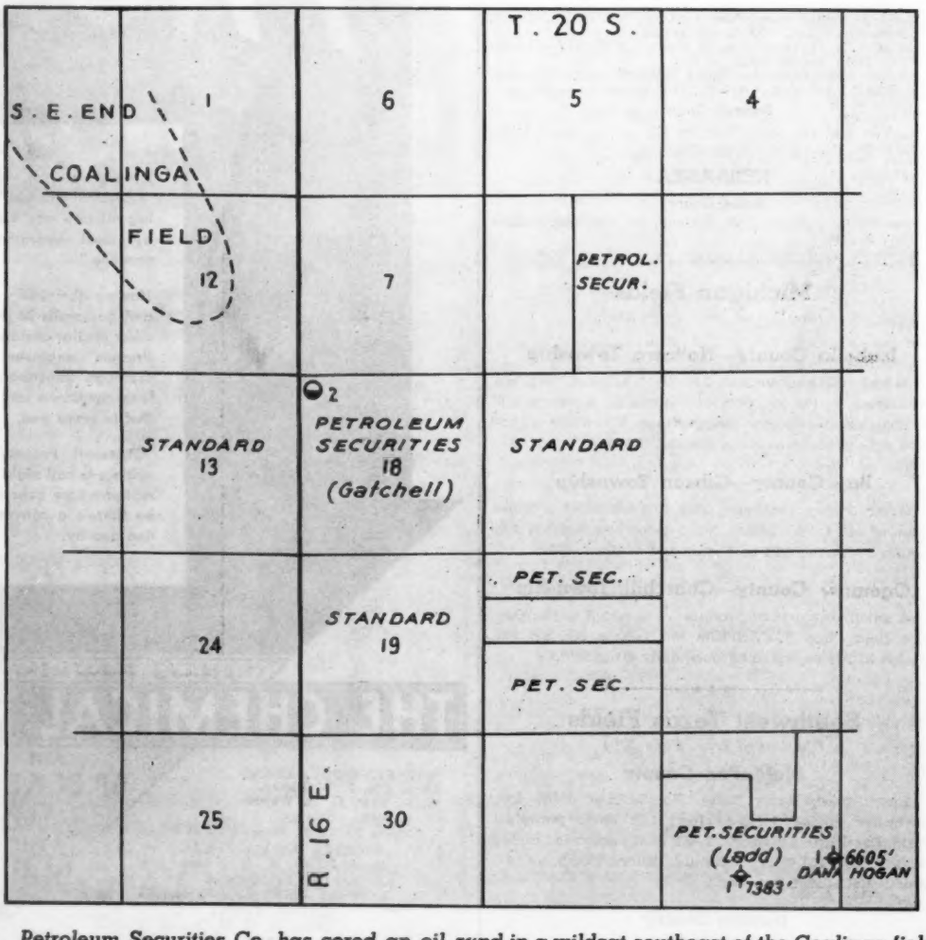
Additional Completions

Union Pacific Railroad Co., which recently staked location for 11 additional wells completed No. 50 flowing 1,410 bbls. per day of 22.8-gravity oil from 2,950 feet. It was finished with 381 feet of 6⅝-inch liner landed at 2,940 feet, and carrying 60-mesh perforations at 2,585-2,796 feet and at 2,816-2,940 feet. Richfield Oil Corp., which has taken out permits for 20 new wells, completed its first producer on the West End Community property pumping 134 bbls. of 16.4-gravity oil daily from 3,470 feet. This producer, the most northeasterly well in the Long Beach Harbor section, was finished with 338 feet of 6⅝-inch liner landed on bottom and carrying perforations at 3,193-3,330 feet and at 3,360-3,470 feet.

Dunlap Oil Co. completed No. 11 Wilmington flowing 4,070 bbls. from three zones, with bottom of the hole at 3,860 feet. This well was finished with 1,107 feet of 6⅝-inch liner carrying perforations at 2,983-3,278 feet and at 3,318-3,860 feet and 355 feet of 8⅝-inch liner including perforations at 2,439-2,744 feet. The pipe was cemented through perforations at 2,983 feet and 3,318 feet. Ranger zone production, which has been shut in, tested 17.9 degrees in gravity while production of the upper Terminal zone tested 25.2 degrees and production of the lower Terminal zone 28.9 degrees. Kreiger Oil Co. completed No. 2 K.W. pumping 295 bbls. of 16.3-gravity oil daily from 3,670 feet but later in the week production was still cleaning up and consequently may show a substantial increase. The hole was finished with 710 feet of 6⅝-inch liner including 502 feet of perforated. Republic Petroleum Co., which last week was the high bidder for the Title Insurance & Trust Co. property fronting on ship channel 3, has staked location for three new wells and present plans contemplate immediate development.

Montebello

The west end of the Montebello field is receiving careful consideration from a number of operators and indications point to an increase in operations in the immediate future. St. Helen's Petroleum Co. No. 24 Monterey indicated that the Pliocene can be expected to be found productive near the axis of the structure. On a formation test it came in flowing 1,450 bbls. of 33.9-gravity



Petroleum Securities Co. has cored an oil sand in a wildcat southeast of the Coalinga field in what is believed to be the Avenal sand of Eocene age

oil cutting 35 per cent, and 10,000,000 feet of gas per day, from 3 feet below the shoe of the 9⅝-inch water string landed at 5,408 feet with bottom of the hole at 5,781 feet. Two days later the cut cleaned up to 16 per cent, following which no further improvement was noted. The company has killed the well and will make another attempt to shut off water. This zone is located in the Pliocene in contrast with the company's No. 20 Monterey, the deep zone discovery which opened up a new productive zone in the Miocene at 6,353 feet. The presence of this promising zone in the Pliocene was logged during the drilling of the company's deep zone discovery but was cased off when the Miocene produced. The showing of No. 24 Monterey of St. Helen's Petroleum greatly enhances the outlook for substantial production in the newly discovered area located in the extreme western end of the Montebello field.

Rosecrans

Universal Consolidated Oil Co. focussed the attention of operators on the Rosecrans field of Los Angeles Basin by completing No. 2 Trust, flowing 1,960 bbls. of relatively clean 33.7-gravity oil and 2,200,000 feet of gas per day from 7,601 feet. This well, which is flowing through a 1-inch bean under a tubing pressure of 220 pounds and a casing pressure of 1,250 pounds, blew in while the crew was washing out perforations preparatory to completion. Barnsdall No. 20 O'Dea is expected to be the next completion listed in the Rosecrans field as the hole is being reamed preparatory to landing a water string. It is bottomed at 7,835 feet in the deep zone which the company discovered last year. On the portion of the Trust lease that Barnsdall retained, ground is being prepared for a new rig to be used in the drilling of No. 3 Trust.

Torrance

Two small recompletions were recorded in the Torrance field during the present week, and while there is a tendency to slow up work there are a number of additional wells being prepared for deepening. W. E. McCaslin No. 2 Hutchins, the largest producing well in the deep zone, is still flowing 290 bbls. of 29.2-gravity oil per day through a 21/64-inch bean from 5,014 feet. The two new wells finished this week were Coast Line Oil Co. No. 1 McBride, completed pumping 220 bbls. of 25.9-gravity oil daily from 5,060 feet, and C. B. Patton No. 1 Meacham, completed pumping 170 bbls. daily from 5,030 feet. The Texas Co. completed No. 3 Wilson pumping about 150 bbls. per day but production has not yet cleaned up. Bottom of the hole is at 4,966 feet. C. W. Camp No. 11 Perkins, a recent completion, is holding up in good shape as current production is 270 bbls. per day under a natural flow from 5,020 feet. Lakeside Oil Co. has completed rig for a new well on its Torrance lease close to No. 1, which was recently completed pumping 177 bbls. of very clean 27.1-gravity oil daily from 4,998 feet. The water problem in the deep zone in the Torrance field is being overcome by landing a solid string of casing and then perforating at specially selected spots. This selectivity permits operators to case off the wet portion of the zone by restricting the amount of formation open. Most of the wells completed require artificial stimulation.

Deep Well Testing

Continental Oil Co. concluded drilling on No. 2-A Kern County Land, a wildcat in the Wasco district of Kern County in San Joaquin Basin at 15,010 feet, and has run in a Baker Securaloy liner for a test of showings logged higher up in the hole. This liner consists of 2,898 feet of 4½-inch landed at 14,315 feet and with perforations at 13,092-175 feet and at 14,049-315 feet. It was cemented through ports with 55 sacks of cement at 13,996 feet and with 130 sacks at 13,005 feet. The part of the hole to be tested consists of sand and shale, and promising showings appeared on the ditch during the course of work in the form of gas and oil spots. One of the points to be tested was not cored and consequently the log does not show the exact formation. Preparations are under way to make a production test within a few days.

North Belridge

Richfield Oil Corp. completed its first commercial producer in the North Belridge field, No. 1-A Belridge in section 22-27-20, flowing 2,120 bbls. of 31.1-gravity oil cutting 11 per cent and 4,500,000 feet of gas per day from the Wagonwheel zone at 8,538 feet. The hole was finished with 484 feet of 5-inch liner, including 307 feet of perforated. The top 102 feet of the liner was aluminum. The well was completed flowing through a 73/64-inch bean and showed a tubing pressure of 750 pounds and a casing pressure of 350 pounds. The 11 per cent cut in production is salt water which probably is edge water as the well is located not far from the edge of the structure. Tide Water Associated Oil Co. is being delayed by a fishing job for tubing in No. 1 in section 21-27-20. General Petroleum Corp. has run into a fishing job in No. 1 St. Helens in section 12-28-20 due to stuck drill pipe at 8,683 feet.

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—						
Diesel and gas oil	.....	.....	.....	.....	178,662	152,932
Gasoline	.....	.....	9,499	1,357	9,499	25,778
Lubricants	.....	.....	3,009	430	76,458	.....
Foreign exports—						
Crude oil	.....	.....	305,307	43,615	1,065,484	829,591
Fuel oil	135,556	19,365	108,987	15,570	500,757	399,361
Diesel and gas oil	104,888	14,984	143,387	20,484	430,248	872,103
Gasoline	240,042	34,292	15,863	2,266	1,231,585	1,466,427
Kerosene	22,877	3,268	.....	.....	133,327	252,035
Lubricants	43,851	6,264	18,857	2,694	145,340	234,631
Coastwise-domestic—						
Fuel oil	81,746	11,678	92,637	13,232	1,606,629	1,684,891
Diesel and gas oil	18,311	2,616	21,455	3,065	422,388	143,716
Gasoline	76,542	10,935	72,860	10,409	1,596,932	1,209,923
Kerosene	13,413	1,916	.....	.....	205,444	41,340

In the Fruitvale field of San Joaquin Basin Pacific Oil & Gas Co. completed No. 2 Guisti in section 14-29-27 flowing 230 bbls. of 18.1-gravity oil per day from 2,997 feet. It is on the north flank of the structure and considering the depth at which production was secured can be considered as commercially productive. In the Lost Hills field Tide Water Associated Oil Co. completed No. 10-B Williamson in section 11-26-20 pumping 35 bbls. per day from 1,327 feet and Standard Oil Co. recomplet-

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TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	April 1		March 25			
Intercoastal-domestic—	Total this week	Daily average	Total last week	Daily average	This week to date	Same time last year
Crude oil	.....	.....	.....	.....	70,180	.....
Diesel and gas oil	.....	.....	.....	.....	.....	176,726
Gasoline	77,928	11,118	.....	.....	539,424	402,703
Kerosene	.....	.....	.....	.....	132,575	.....
Foreign exports—						
Crude oil	870,537	124,362	350,581	50,083	6,087,936	3,182,409
Fuel oil	78,753	11,250	154,243	22,035	1,981,713	3,553,569
Diesel and gas oil	57,460	8,209	163,150	23,307	1,205,432	1,825,509
Gasoline	282,232	40,319	65,839	9,406	1,462,391	1,791,122
Kerosene	71,090	10,156	28,909	4,130	311,062	633,806
Other unfinished oil	.....	.....	.....	.....	.....	179,265
Coastwise-domestic—						
Crude oil	406,269	58,038	452,546	64,649	3,051,785	1,499,133
Fuel oil	44,453	6,350	103,584	14,798	2,897,516	3,787,876
Diesel and gas oil	4,458	637	34,555	4,936	392,637	564,181
Gasoline	270,249	38,607	262,768	37,538	3,594,410	2,914,500
Kerosene	.....	.....	3,584	512	65,104	31,998

ed No. 7 United pumping 60 bbls. of 14.6-gravity oil daily after deepening the hole to 1,553 feet. The Texas Co., which contemplated abandoning No. 2-23 Theta in section 2-26-20 at 1,825 feet, finally decided to plug back to 1,684 feet and then perforate the 7-inch, landed at 1,665 feet in order to ascertain whether production could be secured in the upper zone before pulling out. The hole is at present being bailed after the casing had been perforated at 1,332-35 feet. Standard Oil Co. has filed notice of abandonment on No. 2 Randolph Community, a wildcat in the Semi-Tropic gas field that has been producing a small amount of 27.5-gravity oil per day from 7,620 feet. This deep test was carried down to 9,536 feet but was plugged back to 7,620 feet for a test before being abandoned.

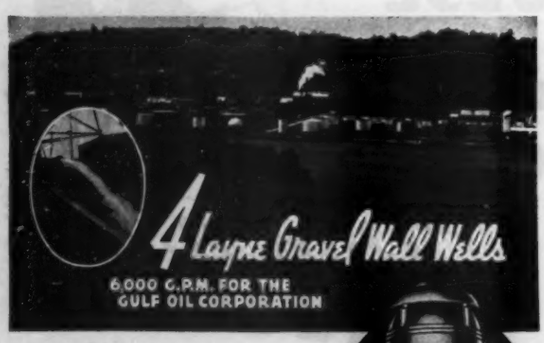
Coastal Area

In the Ventura Avenue field Tide Water Associated Oil Co. recompleted No. 135 Lloyd, flowing 1,301 bbls of clean 31.2-gravity oil and 1,476,000 feet of gas through a 1-inch bean from 9,838 feet. This well, originally completed in an upper zone, is producing under a handicap as there is a string of drill pipe stuck in the hole from 9,100 feet to 9,838 feet. Associated's deep test, No. 18 Hartman, is showing oil and gas on the ditch at 10,780 feet but the bit is still going ahead. In the Rincon field Chanslor Canfield Midway Oil Co. completed No. 20-B Hobson flowing 340 bbls. of 28.9-gravity oil daily from 4,657 feet, but water subsequently broke in and the necessary remedial work is now being done. This hole was finished with 323 feet of 5¾-inch liner including 232 feet of perforated landed at 4,657 feet. In the Santa Maria Valley field Union Oil Co. completed No. 1 Silva in section 24-10-34, pumping 310 bbls. of 15.8-gravity oil per day from 5,203 feet. Top of the Monterey was logged in this well at 4,958 feet and top of the Franciscan basement at 5,185 feet. Amerada Petroleum Co. has completed No. 1 Mayhood in the Rio Vista gas field of Solano County at 4,345 feet but the well was not given a test and no gauge was therefore made of its production.

Los Angeles Basin

In the Seal Beach field Tide Water Associated Oil Co. recompleted No. 4 Byant doing 170 bbls. of 25.2 gravity oil, cutting 18 per cent, on a compressor from 4,975 feet and it appears quite probable that some further work may be required as the cut has gone up to 40 per cent since completion.

In the Huntington Beach field the Texas Co. has recompleted No. 1 Pierce pumping 141 bbls. of very clean 24.9-gravity oil daily from 3,995 feet. This well was carried down to 4,469 feet but was later plugged back to the completion depth. Drilling operations in the Yorba Linda district of Orange County are showing a substantial increase and operators will no doubt closely watch the outcome of Burmah Oil Co. No. 1 Sloan as it is coring an excellent looking oil sand. This well is not very far away from Shell's core hole F, which resulted in large production several months ago.



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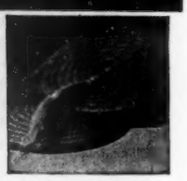
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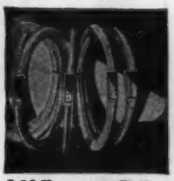
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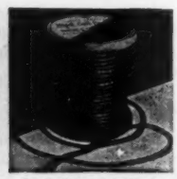
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Kansas Developments

By
DAL DALRYMPLE

Four Probable Pool Openers Preparing for Potential Tests

Winter's belated fling curtailed field activity in Kansas the past week, necessitating the shutting down of operations in many areas and delaying completion of several important tests. However, the week was not without some interesting developments, one of these being the north extension of the Kraft pool in Barton County.

Derby Oil Co. No. 1 H. F. Frees, SW SW NE section 3-17-11w, one-fourth mile north of Kraft production, was completed for initial potential of 2,031 bbls. of oil daily. It topped Arbuckle lime at 3,320 feet, was bottomed at 3,333 feet, and 7-inch casing was set on top of the lime.

One pool opener was near completion and four other discoveries were preparing to take potential tests. Amerada Petroleum Corp. and Westgate-Greenland Oil Co. No. 1 Johns, SE cor. section 25-22-5w, which opened a pool near Buhler in northeastern Reno County, had initial potential of 912 bbls. of oil daily from Simpson sand topped at 3,897 feet, total depth 3,901 feet. South offset has been staked by Derby Oil Co. at No. 1 Wood, NE cor. section 36-22-5w.

Crown Petroleum Co. and others No. 1 Peter Schartz, SW SE NW section 7-20-11w, 1½ miles south of Ellinwood in Barton County, topped Arbuckle lime at 3,346 feet, total depth 3,352 feet, and had a hole full of oil. Nearest production is in the Ellinwood pool, 1½ miles eastward.

Stafford County Strikes

Continental Oil Co. and others No. 1 Fair, CNL SW section 12-25-13w, some 8 miles southeast of St. John in Stafford County, was preparing for potential test. It found Arbuckle lime at 4,153 feet, total depth 4,163½ feet. It is about 3 miles southeast of the St. John pool.

National Refining Co. No. 1 Bonham, SW SW SE section 28-25-12w, 4½ miles southeast of the No. 1 Fair, also due for potential, pumped 114 bbls. of oil in 12 hours from Arbuckle lime found at 4,200 feet, total depth 4,212 feet. After the 12-hour test, it produced at the rate of 13 bbls. of oil an hour before shutting down to prepare for potential. Gravity of the oil was 32 degrees. It was on a farm-out from Stanolind Oil & Gas Co.

The Graham County discovery well was due to acidize and test. It is the Continental Oil Co. and Cities Service Oil Co. No. 1 Morel, C W half E half NE section 15-9-21w, 11 miles southeast of Hill City. It topped Arbuckle lime at 3,711 feet, set 7-inch casing there, and was bottomed at 3,721 feet. It swabbed 192 bbls. of oil in four hours and later oil rose 1,800 feet in the hole in one hour. This is the first commercial production to be found in Graham County. Nearest production is in the Wakeeney pool, 13 miles southwest in Trego County.

Extension at Silica

Extension of the Silica pool three-eighths mile northeast in Rice County was indicated at Stanolind Oil & Gas Co. No. 1 Gossman, SE SE NW section 28-19-10w. It found saturation in Arbuckle lime at 3,288-91 feet, with 7-inch casing set on top of lime.

The South Trapp pool in northern Barton County was extended about one-half mile westward at Shell Petroleum Corp. No. 2 Sausen, NE cor. section 13-16-14w, which was acidized and made potential of 945 bbls. of oil daily at total depth of 3,357 feet in Arbuckle lime.

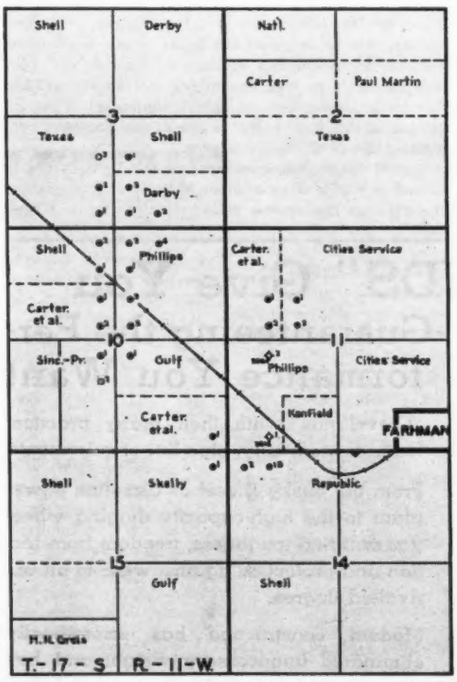
The second test in the Lindsborg pool, McPherson County, was showing as a producer. It is Carter Oil Co. No. 1 Nelson, CEL NE SE section 7-17-3w, one-fourth mile south of the discovery well. It pumped 62 bbls. of oil and 21 bbls. of water in eight hours from Viola lime.

Extension of the Zenith pool, Stafford County, one-half mile eastward appeared imminent at Parker Drilling Co. No. 1 McComb, SW SW NW section 24-24-11w, on a farm-out from Sunray Oil Co. It cored saturation in Misener sand pay at 3,795-97 feet, set 7-inch casing on top of pay, and operators were due to drill plug.

A Wildcat Failure

Pryor & Lockhart, Inc., and A. M. Landon No. 1 De Selms, NE cor. section 3-25-11w, wildcat 2 miles south of the Zenith pool, in Stafford County, topped Arbuckle lime at 4,045 feet and was reported dry and abandoned at 4,100 feet, total depth.

Stanolind Oil & Gas Co. No. 1 Scheib, SW SW SE section 12-22-13w, Drach pool, Stafford County, was acidized at 3,682 feet, total depth in Arbuckle lime, and made potential of 1,859 bbls. of oil daily. Same company's No. 2 Teichmann, NW NW SE section 13-22-13w, one-half mile south of the Drach pool, was drilling below 3,620 feet and looking for Arbuckle lime. The company's No. 1 Hullman, SE SE SW section 11-22-13w, offsetting production, had saturation in Arbuckle lime at 3,749-3,755 feet, total depth, and was bailing.



Mid-Continent Map Co., Wichita

The Kraft pool, Barton County, Kansas, was extended northward at Derby Oil Co.'s producer in section 3-17-11w

New producers in the Bemis field, Ellis County, included Magnolia Petroleum Co. No. 11 Johansen, NE NE SE section 22-11-17w. It made potential of 2,792 bbls. of oil daily at 3,396 feet, total depth, in Arbuckle lime. Champlin Refining Co. No. 2 Hadley, NE SE SW section 29-11-17w, was bottomed at 3,635 feet in Arbuckle lime, and made potentional of 1,596 bbls. of oil daily.

Producer at Cress

A large producer was registered in the Cress pool, Ellis County, at Gulf Oil Corp. No. 2 Cress, SE NE SE section 15-11-17w, which made potential of 3,301 bbls. of oil on retest, producing from Arbuckle lime.

The north offset to the discovery well in the Schroeder area, Ellsworth County, gained potential rating of 3,301 bbls. of oil daily from Arbuckle lime at 3,216 feet, total depth. It was the Gulf Oil Corp. No. 1 Schroeder, SE SW SW section 20-17-9w.

New operations reported in Kansas the past week included the following.

In Barton County, Vernon Oil & Gas Co. and M. B. Armer No. 1 Seyfert, NW SW NE section 3-17-13w, wildcat, 6 miles northeast of Hoisington, a location: Simon Lebow No. 3 Steckel, NW NW SW, section 1-20-11w, Silica area, location; Cities Service Oil Co. No. 3-B Bitter, SW SW SE section 8-16-13w, South Trapp area, location; Indian Territory Illuminating Oil Co. No. 3 Hoffman, SW SE NE section 1-16-14w, Trapp pool, location; Brouk & Thayer No. 1 Soderstrom, SW SW NE section 21-17-13w, Hoisington pool, east offset to the discovery well, moving in material; Sinclair Prairie Oil Co. No. 2 Hoffman, CEL NE section 17-16-13w, South Trapp area, moving in material; Deep Rock Oil Corp. No. 1 Drake, NW NW SE section 4-17-13w, 1 mile north of the Ainsworth pool, location; Indian Territory Illuminating Oil Co. No. 8 Bryant, NE SE NW section 25-20-11w, South Silica area, location.

In Chautauqua County, E. & H. Oil Co. No. 1 Elder, SE SE NE section 36-33-10, has spudded. It is 4 miles west of Sedan.

Estimated Daily Production

Estimated daily production for Kansas for the week ending April 9, and for the preceding week, was as follows:

	Barrels	
	Apr. 9	Apr. 2
Oxford City	2,050	1,750
Burrton	11,550	11,425
Ritz-Canton	6,575	6,550
Graber	1,300	2,625
Hollow-Nikkel	3,850	3,775
Lerado	825	1,200
Voshell	3,125	3,075
Wellington	2,325	2,300
Ellsworth County:		
Lorraine	2,525	2,675
Other pools	1,225	1,325
Rice-Barton counties:		
Bloomer	2,050	2,325
Chase	5,700	5,675
Geneseo	2,100	2,050
Raymond	1,150	1,100
Silica	9,075	12,525
Silica—South	2,150	2,400
Keesling	850	1,125
Wherry	3,900	4,050
Miscellaneous Rice	3,235	2,615
Miscellaneous Barton	4,830	6,610
Russell County:		
Fairport	2,020	1,845
Gorham	1,695	1,395
Russell	1,020	785
Sullivan	7,665	7,245
Trapp	8,180	8,335
Miscellaneous Russell	6,595	7,955
Sedgwick County:		
Valley Center	1,055	1,010
Miscellaneous	2,880	2,840
Ellis County:		
Bemis	4,700	4,650
Miscellaneous	2,710	3,460
Kingman County	580	627
Stafford County	2,030	2,440
Greenwood County	9,150	9,100
Butler County	15,800	16,000
Other fields	22,405	21,513
Total Kansas	158,875	166,375

Other First Reports

In Ellis County, Cities Service Oil Co. No. 10-B Hall, NW SE SW section 26-11-17w, Bemis area, was moving in material; Gulf Oil Corp. No. 3 Pearl, NW NE SE section 13-11-17w, Cress pool, had rigged up.

In Greenwood County, Irvin Katz staked location for No. 4 Christy, SE SE SW section 12-26-9e, Reece pool.

In the Graber pool, McPherson County, Derby Oil Co. No. 9 Goering, SW SE NE section 17-21-1w, was a location.

In Pratt County, Atlantic Refining Co. No. 1 Harrell, SE NE NW section 11-27-13w, had completed

derrick. It is a west offset to the discovery well in the Iuka pool.

In Rooks County, Republic Natural Gas Co. No. 1 Riddler, SW SW SE section 31-10-17w, north offset to the Burnett pool discovery, had set 10-inch casing at 1,339 feet; Broadview Oil Co. No. 1 Livengood, SE NE NW section 11-9-16w, one-half mile north of the discovery, was a location.

"Slim Holes" May Not Mean Small Diameter in Practice

Interest in drilling holes primarily for exploratory purposes is growing in the oil industry. First suggested by geologists as a means of aiding in the study of subsurface features in areas where general geology and geophysics did not afford much real data, and later adopted by the production department as a means of testing large blocks of acreage quickly and cheaply, the drilling of slim holes has gained favor and seems destined to be used rather generally in the near future for several classes of drilling.

This method of drilling is really a development of coring practice long followed in the metal mining industry and also by the geologists in securing information pertaining to formations buried under surface soils. A few years ago when oil companies were economizing in all departments the drilling of relatively small diameter holes to the key beds to test them was followed. Large blocks of acreage were in this manner checked to determine value and in many instances production was found and later developed by the drilling of commercial wells.

As the finding of new oil fields of commercial importance has become more and more difficult the industry has turned to this idea of drilling slim holes to secure stratigraphic data and it is predicted the practice will grow if the mechanical problems involved can be solved in a satisfactory manner.

At a meeting of the Northeast Oklahoma chapter of the A.P.I. Division of Production held in Tulsa April 5 engineers from Carter Oil Co., Shell Petroleum Corp. and Phillips Petroleum Co. presented many interesting facts regarding the experiences of their respective companies with the development of light rotary outfits. The first use of the light rotary rigs was for drilling input wells for water-flooding projects. These holes were relatively shallow, none being 1,000 feet, but it was found the portable rotary unit could drill them quickly and cheaply and this led to the development of somewhat larger portable outfits for deeper drilling.

The problem of drilling these wells for subsurface information is by no means solved at this time. It has been pointed out it does not necessarily follow that by drilling a small diameter hole the cost will be reduced in proportion to the reduction in hole size. In fact it was found by one company that using 3½-inch drill stem and 6¾-inch bit required 200 hours longer to complete holes to the same depth drilled with 5⅞-inch drill pipe and 9⅞-inch bit. The reason for this slower drilling time with the smaller and lighter equipment is not explained at this time and it is one of the problems confronting the production engineer.

Carter Oil Co. has used semiportable light outfits in Kansas to drill a large number of holes to test acreage. The 9⅞-inch holes were drilled with the lightest type steam rig with two boilers. The 6¾-inch holes were drilled with rotary units equipped with two diesel engines compounded. The average depth of holes was 3,460 feet and the comparative costs of this work is given below.

	Light steam rig 9⅞-inch hole (per foot)	Diesel powered unit 6¾-inch hole (per foot)
Rig labor cost	$1.30	$1.42
Transportation	.28	.14
Bit cost	.36	.52½
Fuel	.37½	.08-8/10
Supervision	.09-2/10	.09-2/10
Supplies and repairs	.39½	.33½
Indirect costs, (wire lines, rotary chain, depreciation at 2 per cent, miscellaneous charges)	.64½	.83
Total	$3.45	$3.43

These figures represent the general cost of this work and include some development costs in adapting the equipment to this problem. It is believed the diesel power rig can be run with four instead of five men per shift. This would reduce the cost to around $3.20 per foot and in that figure there is included about 15 cents per foot for district supervision and expense which might properly be charged to general expenses and not to the cost of exploratory holes. This would bring the cost down to around $3 per foot. The diesel rigs cost about $353 per day to operate. The cost of the steam rigs on a day's basis was not available at the time the above estimates were presented.

The interesting feature of drilling time was discussed and it was stated it required about 568 hours per well with the diesel powered rig using 3½-inch drill stem and 6¾-inch bit while it required only 372 hours per well with the heavier steam powered rig drilling 9⅞-inch hole and using 5⅞-inch drill stem.

The diesel unit cost about $40,000 while the steam rig cost approximately $51,000. These are costs carried on the company inventory.

The Phillips Petroleum Co. engineer discussed the drilling of two 4.300-foot exploratory holes 6¼-inch diameter using 2⅞-inch drill stem and a diesel powered unit mounted upon heavy truck. The two holes were drilled in Andrews County, West Texas, and required a total of 106 days' drilling time, exclusive of about 20 days' additional time needed for rigging up and tearing down and moving.

The cost of running these rigs during average drilling time of 53 days per well was reported at $200 per day and the average speed was 81 feet per day which included coring about 225 feet of Permian lime at the bottom of the hole. On this basis the cost per foot was about $2.47 but if the time and cost of rigging up and moving is added the cost will be nearer $3 per foot.

While costs are essential in this class of work it is known they will be much lower than drilling with regular rotary outfits and this will justify use of some form of light rotary units. It is probable they will be powered with diesel engines and furnished with two small mud pumps because the one 7- by 12-inch pump now furnished is not required to operate at more than one-half to two-thirds capacity during a large part of the drilling time. It is believed to be better economy to furnish a smaller pump which will run at full capacity practically all the time and have a standby unit available.

The territory in which these exploratory units will be used will range from the soft sediments of the Gulf Coast to hard limes and sandstones of Kansas and other areas. This will necessitate considerable study on the part of rig manufacturers and makers of drill bits and accessories to develop equipment suited for this wide range of drilling conditions. If it is going to be possible to dig a 9⅞-inch hole in 200 hours less time than it requires to drill a 6⅝-inch hole to the same depth the engineer is not going to be satisfied until he has found out the reason for the difference.

This matter of drilling speed will have bearing upon the future development of this type equipment but it seems quite definitely on the way into the oil industry. There are a number of other problems to be considered in connection with this type of work but they all seem probable of solution. Type mud, portable mud tanks and ditches, selecting of samples, taking electric cores and making drill stem tests are all part of the general problems and all have certain fixed factors which can only be reduced to a minimum and some of those factors will play a part in hole size and somewhat complicate matters. But they will be solved now the engineers are working on them and slim hole drilling may be considered one of the new practices of the industry which should lead to the discovery of many new oil fields.

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Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ontario, Apr. 9. — Crude and naphtha production from all Alberta fields in February totaled 401,587 bbls., an average of 14,342 bbls. daily compared with 444,196 bbls., a daily average of 14,393 bbls., in January. Turner Valley potential at the end of February was estimated at 33,000 bbls. a day.

In North Turner Valley, Royalite Oil Co. No. 29 Turner Basin, LSD 7, section 27-20-3w5, finished at 6,920 feet after getting the Madison lime at 6,275 feet, was acidized in the lower lime, increasing its natural production of around 150 bbls. a day to a flush estimated at 700 bbls. On a three-day test it showed a potential of 487 bbls., prorated at 204 bbls. The upper limestone will be acidized.

In section 32-18-2w5, on the west flank of South Turner Valley, West Flank Oil Co. No. 1, LSD 1, has been shot and acidized and is running tubing for a production test. It is expected a natural production of 320 bbls. a day will be increased to over 400 bbls.

In section 29-18-2w5, Sunburst Oil Co. No. 1, N half LSD 1, finished at 7,157 feet after getting the Madison at 6,705 feet, was tubed and acidized with 10,000 gallons, and is testing for potential. It shows good gas pressure, and is expected to rank among the large producers. Natural production before acidizing was estimated as high as 900 bbls. a day. Farther west in the same section, Davies Petroleums No. 1, LSD 2, finished at 7,375 feet after getting the lime at 6,898 feet, has been delayed in testing production by a fire when a spark from a short circuit ignited an accumulation of crude on the derrick floor, causing some damage to equipment. The well was undamaged and the production test has been resumed, with indications of a good crude producer.

In section 28-18-2w5, Richland Royalties No. 2, LSD 5, finished 540 feet in the Madison limestone at 6,950 feet, has run tubing and is testing for potential, with indications of heavy crude saturation but only a small gas flow.

In section 20-18-2w5, Spy Hill Royalties No. 1, LSD 16, is testing for potential following a shot and acidizing.

Tests in the Lime

In section 32-18-2w5, West Turner Petroleums No. 1, LSD 2, got the Madison limestone at 6,832 feet and cemented casing at 6,858 feet. It is deepening below 6,865 feet. It is a northerly offset to Commoil No. 1, the largest crude producer in the field.

In section 21-18-2w5, Brown Oil Corp. No. 4, LSD 4, has been completed at 6,721 feet after getting the lime at 6,253 feet. It is preparing to test production, with early indications of a large well.

West Flank Drilling

In the west central Turner Valley area, in section 6-19-2w5, East Crest Oil Co. No. 6, LSD 8, was drilling below 100 feet.

In section 32-18-2w5, Royalite Oil Co. No. 30, LSD 11, is below 5,898 feet. West Turner No. 3 will start work this month in LSD 3, immediately west of No. 1.

In section 29-18-2w5, Commoil No. 2, LSD 10, has finished gas lines and is moving equipment to location. Globe Royalties No. 1, LSD 7, is drilling through the grit beds around 5,470 feet, and logging closely with Commoil No. 1 producer. Model-Spooner-Reward No. 2, S half LSD 1, is below 6,170 feet, and expected to get the Madison limestone around 6,750.

In section 17-18-2w5, Coronation Royalties No. 1, LSD 10, is below 4,310 feet. Royalite Oil Co. No. 32, LSD 8, is below 1,287 feet. Sundance Royalties No. 1, LSD 9, is below 6,442 feet.

In section 16-18-2w5, Royal Canadian Oil Co. No. 2, LSD 4, is below 1,000 feet. Okalta Oil Co. No. 7, LSD 3, is below 1,708 feet. Okalta No. 8, LSD 6, is below 1,239 feet.

In section 9-18-2w5, National Petroleum Corp. No. 2, LSD 14, is deepening from 7,010 feet where the belemnite formation was encountered, and is expected to get the Madison limestone about 7,100 feet. Marine Petroleums No. 1, LSD 11, has derrick up and is moving equipment. L. Chamberlin is in charge for the company. Mid-Royal Oils, Ltd., is negotiating for completion of its No. 2, spudded to 100 feet some time ago in LSD 3, same section.

New South End Tests

In section 16-17-2w5, Firth Petroleum No. 1, LSD 6, is working on derrick and building camp, which has been christened "New Oklahoma." Frank D. Lundy and associates of Vancouver, British Columbia, are sponsoring the test, which is some 3 miles south of Davies No. 3, at present the most southerly drilling well.

P. & H. Development Co., headed by W. H. Pollard of Calgary, has located its No. 1 test in LSD 7, section 5-18-2w5, 1½ miles northwest of Davies No. 3.

Okalta Structure

On the Okalta fold, west of South Turner Valley, Okalta Oil Co. No. 6, LSD 3, section 30-18-2w5, is below 6,080 feet.

North Turner Valley

In North Turner Valley, on the west flank, Home Oil Co. No. 2 Millarville, LSD 6, section 33-20-3w5, is rigging.

Completion of Royalite Oil Co. No. 29 Turner Basin, LSD 7, section 27-20-3w5, as a crude producer with 487 bbls. potential after partially acidizing, has directed attention to the west flank possibilities of North Turner Valley. Royalite No. 29 had been abandoned some years ago by the Turner Basin Oil Co. at 4,040 feet. The test started in the Benton, entered the Blairmore formation, and as a result of faulting reverted to the Benton, with a further recurrence of the Blairmore at 3,630 feet. After resumption by the Royalite company, it got the Madison limestone at 6,275 feet and finished at 6,916 feet, somewhat shallower than some of the recent wells on the South Turner Valley west flank.

Royalite No. 29 is about a mile north and a quarter-mile west of Model Oils No. 1, the first crude producer from the lime in North Turner Valley. Both wells are close to the western fringe of the naphtha-wet gas area. The experience of west flank drilling in South Turner Valley indicates that wells farther west and down the flank should be larger crude producers. Both Phillips Royalties No. 1 to the south and Home No. 2 Millarville to the north of Royalite No. 29 are somewhat farther west and should be lower on structure.

In the potential west flank crude area of North Turner Valley a number of wells are standing unfinished from about the year 1930, some of which may be completed as a result of the new developments.

There are several unfinished tests farther north in Township 21-3w5. All these tests were located in the potential crude area on the west flank of North Turner Valley. Abandonment was due in practically all cases to financial difficulties resulting from the depression, together with more or less definite indications of some faulting.

Limit Pipe Line Runs

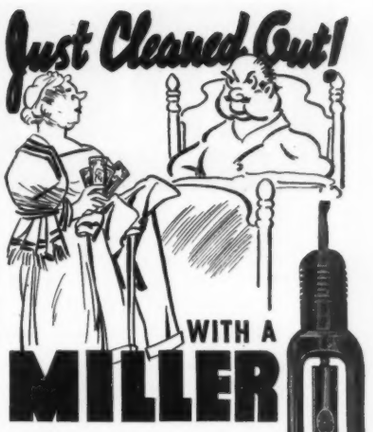
As a temporary measure to handle the increasing crude production of Turner Valley till the new Royalite pipe line is finished, the Royalite company is limiting the output for April to six-sevenths of the present prorated amount of crude wells whose production it handles. Operators have the alternative of closing down wells one day in seven or curtailing the daily output by one-seventh of the present 42 per cent proration quota. Pipe lines have been operating to their present capacity of 13,000 bbls. a day and a reserve built up of 85,000 bbls. in storage. When the new Royalite pipe line is completed about May 1, capacity will be increased to 24,000 bbls. a day, when operators will be allowed extra barrelage till the April curtailment is made up; after which it is expected the proration quota will be increased.

Testing for Potentials

Tests by Alberta government engineers to determine new potentials for Turner Valley crude producers started on April 8 and will continue through the greater part of the month. Under the new method of testing, wells will produce their allowable quota under proration for 10 days and on the eleventh day will be operated to capacity. The official potential will be 66⅔ per cent of the eleventh-day production. Wells already tested for potentials will be handled in three groups, commencing at the north end of the crude area, tests starting on April 8, 10 and 12, respectively.

With wells previously untested for potentials, a preliminary potential will be fixed on the basis of the average production for the first three days. This preliminary will apply for the first 27 days' production, the last 10 days being not less than the allowable. On the twenty-eighth day an unrestricted 24-hour test will be taken; and the potential will be 66⅔ per cent of this day's unrestricted flow.

No well in either class is to be acidized within 10 days previous to the official test day. Tests will be taken every six months, in April and October, and all wells tubed to secure maximum efficiency.



With the sand removed, production is increased—that's why the MILLER is bringing in more oil dollars throughout the world.

The MILLER is made in diameters of 2½, 3, 3½, 4, 4¼, 5, 5½, 7 and 9 inches and lengths of 20, 25 and 30 feet. 5/32-inch wall thickness in REGULAR Type, ¼-inch wall tubes HEAVY Type Sand Pumps.

INTERCHANGEABLE BOTTOMS
To Meet Every Condition

- BAILER BOTTOM — With the Bailer Bottom installed the MILLER is quickly changed to a Bailer giving you a combination of either Bailer or a Sand Pump in one tool.
- SAND BOTTOM — Used when tools are run and when well is shot to quickly remove loose material.
- STAR BOTTOM — Used for cutting the sand loose.
- CHISEL BOTTOM (In Pump) — With this bottom tightly packed sand can be easily broken in small pieces so it can be picked up in the pump.

Write for Descriptive Folder and Price List

See Page 1186 COMPOSITE CATALOG

PATENTED NO. 1370340 NO. 1523804 NO. 1787280 NO. 1862628 NO. 1866628 NO. 2055467

MILLER Sand Pump Co.

General Offices and Shop, Box 4516
OKLAHOMA CITY, OKLA., U. S. A.

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FOR SALE BY SUPPLY STORES EVERYWHERE

WILDCAT OPERATIONS

CALIFORNIA

IMPORTANT WELLS AND NORTHERN CALIFORNIA WILDCATS

Company, well, location and county—	S.T.R.	Depth	Status
Wilshire Oil, No. 1 Gaviota, Santa Barbara	35- 5-33	3,075	fish D.P.
Hancock-Bush, No. 2 Bradley, Santa Maria, S. Barb.	26-10-34	3,190	sd. sh. drlg.
Palm Oil, No. 1 Bill, Santa Maria, Santa Barbara	27-10-34	3,978	sd. sh. drlg.
Hanoli Oil Co., No. 1 Holser, Santa Maria, S. Barbara	27-10-34	2,340	sd. sh. drlg.
Cal. Lands, Inc., No. 4 Gallison, S. Maria, S. Barbara	26-10-34	3,790	sd. sh. drlg.
Cal. Lands, Inc., No. 1 Mac Donnell, S. Maria, S. Barb.	28-10-34	4,010	sd. sh. drlg.
Moore, E. H., No. 1-H Sugar, Santa Maria, S. Barbara	19-10-34	5,250	sd. sh. drlg.
Pet. Sec. Co., No. 1 Carey, Santa Maria, Santa Barbara	27-10-34	5,249	pump 830 b.d
Signal Oil, No. 3 Romalho, Santa Maria, S. Barbara	27-10-34	4,846	flow 3,850 b.d.
Signal Oil, No. 1 Yelkin, Santa Maria, Santa Barbara	26-10-34	2,481	sd. sh. drlg.
Union Oil, No. 1 Stinson, Santa Maria, Santa Barbara	28-10-34	3,590	sd. sh. drlg.
Union Oil, No. 1-19 Enos, Santa Maria, S. Barbara	19-10-33	2,754	pump 50 b.d.
Union Oil, No. 3 Le Roy, Santa Maria, Santa Barbara	24-10-35	758	cmtd. 758
Union Oil, No. 2-1-0 Santa Maria, Santa Barbara	21-10-34	5,430	O. S. drlg.
Union Oil, No. 1 Silva, Santa Maria, Santa Barbara	24-10-35	5,203	sd. sh. drlg.
Pet. Equities, No. 1 Webber, Santa Maria, S. Barbara	27-10-34	4,318	pump 620 b.d.
Valoco Oil, No. 1 Boyd, Santa Maria, Santa Barbara	28-10-34	1,998	sd. sh. drlg.
Wilson Oil, No. 1-B Santa Maria, Santa Barbara	26-10-34	4,950	sd. sh. drlg.
Sunshine Oil, No. 3-W Santa Maria, Santa Barbara	27-10-34	2,486	sd. sh. drlg.
Bay City Oil, No. 1-M Santa Maria, Santa Barbara	27-10-34	3,991	br. sh. drlg.
Pac. West. Oil, No. 3-S Santa Maria, Santa Barbara	27-10-34	4,904	flow 2,880 b.d.
Pima Drlg., No. 1 Morganti, Casmalia, Santa Barbara	13- 9-35	1,777	pump 145 b.d.
Standard Oil, No. 1 Cat Canyon, Santa Barbara	27- 9-33	5,529	redrlg. 4,640
Bell, A. E., No. 4 York, Lompoc, Santa Barbara	33- 8-34	2,760	pump 25 b.d.
United West. Oil, No. 1 Los Olivos, Santa Barbara	16- 7-30	2,890	resume work
Fisher, D., No. 1 Cuyama, Santa Barbara	28-11-28	1,296	idle
Carpinteria Oil, No. 1 Carpinteria, Santa Barbara	32- 4-25	2,070	br. sh. drlg.
Gauthier Oil, No. 1 Summerland, Santa Barbara	22- 4-26	1,465	sd. sh. drlg.
Rowe, W. G., No. 1 Johnson, Oxnard, Ventura	15- 1-22	4,115	redrlg. 2,698
Texas Co., No. 5 Yale, South Mountain, Ventura	13- 3-21	3,381	sd. sh. drlg.
Texas Co., No. 1 Edwards, Camarillo, Ventura	19- 2-21	6,111	fish D.P.
Merchants Pet., No. 1 Sespe, Ventura	1- 4-20	180	sd. sh. drlg.
C. C. M. Oil, No. 19 Hobson, Rincon, Ventura	17- 3-24	4,022	br. sh. drlg.
C. C. M. Oil, No. 20 Hobson, Rincon, Ventura	8- 3-24	4,713	P.B. 4,657
C. C. M. Oil, No. 22 Hobson, Rincon, Ventura	17- 3-24	3,196	sd. sh. drlg.
Richfield Oil, No. 6-H Rincon, Ventura	17- 3-24	2,580	cmtd. 2,548
Tide Water A. O., No. 19 V.L.W., Ventura, Ventura	26- 3-23	7,820	hd. sd. drlg.
Tide Water A. O., No. 41 V.L.W., Ventura, Ventura	24- 3-23	7,305	flow 1,065 b.d.
Tide Water A. O., No. 68 Lloyd, Ventura, Ventura	27- 3-23	3,860	sd. sh. drlg.
Tide Water A. O., No. 69 Lloyd, Ventura, Ventura	27- 2-23	7,179	swab water
Tide Water A. O., No. 135 Lloyd, Ventura, Ventura	27- 2-23	9,838	D.P. froze
Tide Water A. O., No. 138 Lloyd, Ventura, Ventura	23- 3-23	9,675	O. S. drlg.
Tide Water A. O., No. 18 Hartman, Ventura, Ventura	22- 3-23	10,790	sd. sh. drlg.
Tide Water A. O., No. 11 McGonigle, Ventura, Ventura	23- 3-23	2,561	sd. sh. drlg.
Shell Oil, No. 94 Taylor, Ventura Ave., Ventura	20- 3-23	6,070	sd. sh. drlg.
Shell Oil, No. 37 Gosnell, Ventura Ave., Ventura	28- 3-23	2,436	sd. sh. drlg.
General Pet., No. 13 Notten, Ventura Ave., Ventura	28- 3-23	9,871	P.B. 9,451
Lloyd Corp., No. 1 Dabney-Lloyd, Ventura, Ventura	24- 3-23	1,167	sd. sh. drlg.
Amerada Pet., No. 5 Beer, Devils Den, Kern	22-26-19	7,490	br. sh. drlg.
H. L. F. Oil, No. 1 Devils Den, Kern	25-25-18	151	idle
Gibson Oil, No. 3 Alferitz, Devils Den, Kern	14-25-18	169	sd. sh. drlg.
Par-Mer Oil, No. 1 McKittrick, Kern	6-31-22	2,895	sd. sh. drlg.
Austin, John W., No. 1 Hampshire, McKittrick, Kern	26-30-22	980	idle
Standard Oil, No. 2 Randolph, Semi-Tropic, Kern	14-27-23	7,620	flow 50 b.d.
Continental Oil, No. 2 KCL, Wasco, Kern	8-27-24	15,004	will test
Chico-Martinez Oil, No. 1 South Belridge, Kern	1-29-20	1,050	cleaning out
Ohio Oil, No. 1 Ford, South Belridge, Kern	6-29-22	4,497	sd. sh. drlg.
Texas Co., No. 2-23 Theta, Lost Hills, Kern	2-26-20	1,825	P.B. 1,684
Standard Oil, No. 7 United, Lost Hills, Kern	2-26-20	1,553	pump 35 b.d.
Tide Water, No. 10-B Williamson, Lost Hills, Kern	11-26-20	1,327	pump 30 b.d.
Tide Water A. O., No. 1 Elliott, Lost Hills, Kern	11-26-20	1,222	cleaning out
Argo Pet., No. 1 Farnsworth, Lost Hills, Kern Co.	11-26-20	1,291	bailing
Shell Oil, No. 1 Voight, Belridge, Kern	32-27-20	4,100	idle
Belridge Oil, No. 27-5 North Belridge, Kern	27-27-20	3,280	br. sh. drlg.
Belridge Oil, No. 27-6 North Belridge, Kern	27-27-20	6,020	br. sh. drlg.
Belridge Oil, No. 35-26 North Belridge, Kern	35-27-20	5,750	sd. sh. drlg.
Tide Water A. O., No. 1-21 North Belridge, Kern	21-27-20	8,640	fish tubing
Tide Water A. O., No. 3-21 North Belridge, Kern	21-27-20	2,450	sd. sh. drlg.
Richfield Oil, No. 1-A North Belridge, Kern	22-27-20	8,538	O. S. drlg.
Richfield Oil, No. 2 North Belridge, Kern	22-27-20	4,590	sd. sh. drlg.
Texas Co., No. 3 Martin, North Belridge, Kern	22-27-20	7,609	br. sh. drlg.
Texas Co., No. 4 Martin, North Belridge, Kern	22-27-20	2,252	sd. sh. drlg.
General Pet., No. 1 St. Helens, Belridge, Kern	12-28-20	8,685	D.P. stuck
Coast Expl., No. 1 Coffee, Round Mountain, Kern	6-28-29	1,982	P.B. 1,978
Pan-May Oil, No. 1 Coffee, Round Mountain, Kern	31-27-29	231	sd. sh. drlg.
Cal-Western Oil, No. 11 Round Mountain, Kern	12-28-28	1,855	rig to pump
Long, Harry, No. 2 Willis, Round Mountain, Kern	2-28-28	2,112	dry; abd.
Shell Oil, No. 5-1 Olcese, Round Mountain, Kern	22-28-29	2,025	dry; abd.
Kern River Oilfields, No. 25-1-C Kern Front, Kern	25-28-27	2,007	cleaning out
Rubenstein, A. B., No. 1 Lerdo, Kern	20-28-27	3,302	pump water
Helm & Smith, No. 2-A Kernco, Kern River, Kern	34-28-28	667	O. S. drlg.
W. T. W. Pet., No. 1 Packard, Mount Poso, Kern	14-27-28	1,375	gr. sd. drlg.
Carter, J. P., No. 2 S.P.L., Mount Poso, Kern	3-27-28	1,473	cleaning out
Bargol Oil, No. 2 Claflin, Mount Poso, Kern	10-27-27	2,210	gr. sd. drlg.
Framac Oil, No. 3 Brown, Mount Poso, Kern	22-27-27	1,351	cmtd. 1,340
Reynolds Oil, No. 1 Premier, Mount Poso, Kern	30-27-27	398	sd. sh. drlg.
Crestmont Oil, No. 1 Glide, Mount Poso, Kern	19-26-28	1,663	sd. sh. drlg.
Western Gulf Oil, No. 34 KCL, Fruitvale, Kern	14-29-27	2,170	sd. sh. drlg.
Wilbur, V. R., No. 1 Fruitvale, Kern	22-29-27	4,039	deepening
Pacific Oil & Gas, No. 2 Guisti, Fruitvale, Kern	14-29-27	2,997	O. S. drlg.
Wood-Callahan Oil, No. 21-2 Edison, Kern	21-30-29	3,675	P.B. 3,145
Wood Callahan Oil, No. 1 Porter, Edison, Kern	20-30-29	4,187	idle
Union Oil, No. 1 Berry, Arvin, Kern	15-31-29	6,129	O. S. drlg.
Petrex, Inc., No. 1 Arvin, Kern	32-31-30	3,648	will deepen
Superior Oil, No. 2 Wagner, Rio Bravo, Kern	35-28-25	11,340	br. sh. drlg.
Superior Oil, No. 3 Wagner, Rio Bravo, Kern	35-28-25	7,757	sd. sh. drlg.
Superior Oil, No. 1 Geissinger, Rio Bravo, Kern	32-38-25	11,288	flow 1,120 b.d.
Superior Oil, No. 1 Ruhl, Rio Bravo, Kern	1-29-25	11,450	sd. sh. drlg.
Union Oil, No. 2-34 KCL, Rio Bravo, Kern	34-28-25	11,204	fish tubing
Getty Oil, No. 1 Ramsey, Rio Bravo, Kern	35-28-25	10,381	sd. sh. drlg.
General Pet., No. 1 Wagoner, Rio Bravo, Kern	35-28-25	10,020	sd. sh. drlg.
General Pet., No. 2 Wagoner, Rio Bravo, Kern	35-28-25	6,980	sd. sh. drlg.
Standard Oil, No. 18-1 KCL, Una, Kern	29-28-26	6,882	sd. sh. drlg.
Dilmar Oil, No. 1 Quinn, Jasmin, Kern	15-25-27	2,956	cleaning out
Amerada Pet., No. 1 Core Hole, Jasmin, Kern	2-25-27	1,130	bl. sh. drlg.
Shell Oil, No. 58-A KCL, Bellevue, Kern	29-29-27	7,214	dry; abd.
Standard Oil, No. 11-2 KCL, Greeley, Kern	20-29-26	10,660	gr. sh. drlg.
Standard Oil, No. 11-13 KCL, Greeley, Kern	20-29-26	7,780	P.B. 7,760
Standard Oil, No. 11-14 KCL, Greeley, Kern	18-29-26	7,572	sd. sh. drlg.
Standard Oil, No. 1 Ross, Greeley, Kern	20-29-26	6,581	sd. sh. drlg.
Shell Oil, No. 76-1-B KCL, Greeley, Kern	16-29-26	7,260	sd. sh. drlg.
Shell Oil, No. 41-29 KCL, Ten Section, Kern	29-30-26	7,497	sd. sh. drlg.
Shell Oil, No. 34-30-A KCL, Ten Section, Kern	30-30-26	5,285	sd. sh. drlg.
Shell Oil, No. 25-30-B KCL, Ten Section, Kern	30-30-26	7,761	sd. sh. drlg.
Shell Oil, No. 81-31-B KCL, Ten Section, Kern	31-20-26	8,220	flow 2,520 b.d.
Shell Oil, No. 2-13-A KCL, Canal, Kern	13-30-25	8,212	O. S. drlg.
Shell Oil, No. 81-14-A KCL, Canal, Kern	14-30-25	6,184	sd. sh. drlg.
Ohio Oil, No. 5-E KCL, Canal, Kern	14-30-25	8,176	O. S. drlg.
Ohio Oil, No. 8-A KCL, Buena Vista Lake, Kern	32-31-26	9,403	sd. sh. drlg.
Richfield Oil, No. 1 M.C., Midway-Sunset, Kern	24-31-22	2,560	bailing
Quality Oil, No. 1 W. P., Midway-Sunset, Kern	27-32-23	1,835	deepened
Berry Oil, No. 22 Midway-Sunset, Kern	28-12-24	1,140	rig to pump
Victor Oil, No. 14 Midway-Sunset, Kern	35-32-23	3,320	P.B. 2,170
National Oil, No. 17 Midway-Sunset, Kern	35-32-23	2,350	O. S. drlg.
Texas Co., No. 1 Pioneer, Midway-Sunset, Kern	33-11-23	7,997	br. sh. drlg.
Texas Co., No. 31 Midway-Sunset, Kern	32-32-24	1,140	sd. sh. drlg.
Abbott, F. E., No. 12 Lewis, Sunset, Kern	20-11-23	2,662	idle
Universal Cons'd., No. 1 Tejon, Kern	33-11-19	4,553	cleaning out
Shell Oil, No. 4-26 KCL, San Emidio, Kern	26-11-22	8,208	fish D.P.
Richfield Oil, No. 1 KCL, Wheeler Ridge, Kern	28-11-20	1,965	sd. sh. drlg.
Pure Oil, No. 1 SPL, Cantua, Fresno	31-18-18	10,862	fish D.P.
Gauthier, J., No. 2 Hubbard, Panoche Creek, Fresno	12-14-11	635	fish D.P.
Pet. Sec., No. 2 Gatchell, Jacalitos, Fresno	18-20-16	6,878	O. S. drlg.
Dauphin Dev., No. 1 Alcalde, Fresno	30-21-14	3,778	cleaning out
Shell Oil, No. 35-1 Coalinga, Fresno	36-19-14	1,385	sd. sh. drlg.
K. N. D. A., No. 67-20-J Kettleman North, Fresno	20-21-17	10,506	hd. sd. drlg.

KEY TO ABBREVIATIONS USED IN DRILLING REPORTS

Abd., abandoned.
Acd., acidized.
B.O., barrels of oil.
B.P.D., barrels per day.
B.D., barrels daily.
B.P., back pressure.
B.R., building rig.
Br. sh., brown shale.
B.S., basic sediment.
Cd. or Crd., cored.
C.D., corrected depth.
Cg., coring.
Cmtd., cemented.
C.O., cleaning out.
Comp., completed.
Compr., compressor.
C.P., casing pressure, also cement through perforations.
Csg., casing.
D.D., drilling (or drilled) deeper.
Drlg. or Drg., drilling.
Drk. or Dk., derrick.
D.S., drill stem.
D.&A., dry and abandoned.
Fsg., fishing.
Gbo., gumbo.
G.I., gas injection.
Gr., gravity.
Gr. sd., gray sand.
Grn. sh., green shale.
Hd. sd., hard sand.
H.F.W., hole full of water.
I.P., initial production.
L., lime.
L.D.D., later drilled deeper.
Lnr., liner.
Loc., location.
M.I.M., moving in material.
M.I.R., moving in rig.
M.I.R.T., moving in rotary tools.
M.O.T., milling on tools.
O.I.H., oil in hole.
O.S., oil sand.
O.T.D., old total depth.
O.W.D.D., old well drilling deeper.
O.W.P.B., old well plugging back.
P.B., plugging or plugged back.
P.B.P., pulling or pulled big pipe.
P.L., pipe line.
P.L.O., pipe line oil.
Pmpg., pumping.
P.O.P., putting on pump.
P.P., pulled pipe.
Rd. sd., red sand.
Rd. sh., red shale.
Recmt., recemented.
Rmg., reaming.
Redrlg., redrilling.
Rng., running.
R.O.G., rig on ground.
R.P., rock pressure.
R.U., rigging up.
R.U.R., rigging up rotary.
R.U.S.T., rigging up standard tools.
R.&T., rods and tubing.
S. or Sd., sand.
S.D., shut down.
Sdy. sh., sandy shale.
Sdtr., or St. sidetracking.
S.D.P.L., shut down for pipe line.
S.D.O., or S.D.W.O., shut down awaiting orders.
S.G., show gas.
Sh.&L., shale and lime.
S.I., shut in.
S.I.P., shut in, prorated.
S.L.M., steel line measurement.
S.O., show oil.
S.O.G.&W., show of oil, gas and water.
Spdg. or Spd., spudding.
S.R., straightreaming.
Stdg., standardizing (also standing).
S.W., salt water.
Swbg., swabbing.
T.A., temporarily abandoned.
Tbg., tubing.
T.D., total depth.
T.P., tubing pressure.
Tr., tract.
U.R., underreaming.
W.I.H., water in hole.
W.O., workover.
W.O.C. or W.O.C.S., waiting for cement to set.
W.P., working pressure.
W.S.O., water shutoff.
W.S.S.O.K., water shutoff O.K.
W.S.O.N.G., water shutoff no good.
W.S.R. or W.O.S.R., awaiting standard rig.
Wtr., water.

K. N. D. A., No. 72-4-P Kettleman North, Fresno	4-22-17	8,450	hd. sd. drlg.
K. N. D. A., No. 6-8-Q Kettleman North, Kings	8-22-18	7,110	gr. sd. drlg.
K. N. D. A., No. 38-8-Q Kettleman North, Kings	8-22-18	6,560	br. sh. drlg.
K. N. D. A., No. 27-16-Q Kettleman North, Kings	16-22-18	3,673	sd. sh. drlg.
K. N. D. A., No. 58-16-Q Kettleman North, Kings	16-22-18	5,587	idle
K. N. D. A., No. 47-18-Q Kettleman North, Kings	18-22-18	7,494	gr. sd. drlg.
K. N. D. A., No. 43-20-Q Kettleman North, Kings	20-22-18	5,591	br. sh. drlg.
Standard Oil, No. 46-13-H Kettleman North, Fresno	14-21-16	9,597	will deepen
Standard Oil, No. 27-21-J Kettleman North, Fresno	21-21-17	10,800	O. S. drlg.
Standard Oil, No. 58-33-J Kettleman North, Fresno	33-21-17	7,298	gr. sd. drlg.
Standard Oil, No. 2-11-P Kettleman North, Kings	11-22-17	7,850	cleaning out
Standard Oil, No. 78-1-P Kettleman North, Kings	1-22-17	3,470	sd. sh. drlg.
Standard Oil, No. 87-1-P Kettleman North, Kings	1-22-17	7,481	gr. sd. drlg.
Standard Oil, No. 21-13-P Kettleman North, Kings	13-22-17	7,248	fish D.P.
Standard Oil, No. 41-7-Q Kettleman North, Kings	7-22-18	8,014	gr. sd. drlg.
Standard Oil, No. 74-7-Q Kettleman North, Kings	7-22-18	4,991	sd. sh. drlg.
Standard Oil, No. 85-7-Q Kettleman North, Kings	7-22-18	6,874	br. sh. drlg.
Bandini Pet., No. 5 Whepley, Kettleman N., Fresno	35-21-17	9,515	cleaning out
Turner, L. E., No. 1 Glaze, Pixley, Tulare	15-22-26	2,802	cmtd. 2,775
Wilshire Oil, No. 1 Cowell, Half Moon Bay, San Mateo	20- 6- 5	8,030	P.B. 2,525
Amerada Pet., No. 1 Mayhood, Rio Vista, Solano	36- 4- 2	4,345	gas well

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well, location and county—	S.T.R.	Depth	Status
Sovereign Oil, No. 1 El Segundo, Los Angeles	12- 3-15	7,354	flow 1,160 b.d.
Termo Co., No. 2 El Segundo, Los Angeles	12- 3-13	7,400	pump 250 b.d.
Rolling Hills Pet., No. 1 Palos Verdes, Los Angeles	27- 2-14	4,218	idle
Patton, C. B., No. 1 Meacham, Torrance, Los Angeles	15- 4-14	5,032	P.B. 4,977
Patton, C. B., No. 2 Neil, Torrance, Los Angeles	14- 4-14	5,016	sd. sh. drlg.
McCaslin, W. E., No. 2 Hutchins, Torrance, L. Angeles	14- 4-14	5,014	flow 205 b.d.
Torrance Oil, No. 1 Grubb, Torrance, Los Angeles	14- 4-14	4,670	sd. sh. drlg.
Sol Oil, No. 1 Torrance, Torrance, Los Angeles	23- 4-14	3,825	redrlg. 3,198
Andrews & Mitchell, No. 5 Kirk, Torrance, L. Angeles	23- 4-14	3,891	sd. sh. drlg.
Anderson, N. H., No. 2 Torrance, Los Angeles	14- 4-14	5,051	will P.B.
McDonald & Burns, No. 3 Moore, Torrance, L. Ang.	23- 4-14	3,890	sd. sh. drlg.
Emerald Oil, No. 1 fee, Torrance, Los Angeles	23- 4-14	5,120	cleaning out
Camp, C. W., No. 12 Torrance, Los Angeles	23- 4-14	3,997	sd. sh. drlg.
Doyle Pet., No. 1 Bond, Torrance, Los Angeles	23- 4-14	5,098	sd. sh. drlg.
Doyle Pet., No. 2 Neill, Torrance, Los Angeles	14- 4-14	4,999	pump 80 b.d.
Doyle Pet., No. 3 Getty, Torrance, Los Angeles	14- 4-14	3,780	dry; abd.
Elyod Oil, No. 1 Post, Torrance, Los Angeles	14- 4-14	3,774	redrlg. 3,480
Peso Oil, No. 1 Marcoux, Torrance, Los Angeles	23- 4-14	4,860	sd. sh. drlg.
Kelly, F. C., No. 1 Huyck, Torrance, Los Angeles	14- 4-14	3,762	cleaning out
Marcel Oil, No. 1 Torrance, Los Angeles	14- 4-14	4,890	sd. sh. drlg.
Woolner Oil, No. 1 Torrance, Los Angeles	14- 4-14	3,880	sd. sh. drlg.
Krause & Baker, No. 2 Gladys, Torrance, L. Angeles	14- 4-14	3,795	rigged up
Peters Royalty, No. 1 Torrance, Los Angeles	14- 4-14	3,788	redrlg. 1,994
Pilgrim Oil, No. 1 P. & O., Torrance, Los Angeles	14- 4-14	3,800	redrlg. 3,596
Pilgrim Oil, No. 2 Getty, Torrance, Los Angeles	23- 4-14	3,780	will deepen
Sierra Dev., No. 2 Weiller, Torrance, Los Angeles	23- 4-14	4,081	sd. sh. drlg.
Texas Co., No. 5 Redondo, Torrance, Los Angeles	15- 4-14	3,628	rig to pump
Texas Co., No. 3 Wilson, Torrance, Los Angeles	15- 4-14	4,966	sd. sh. drlg.
Wilson, R. K., No. 1 Cook, Torrance, Los Angeles	14- 4-14	3,770	redrlg. 1,942
South. Cal. Drlg., No. 1 Hough, Torrance, L. Angeles	14- 4-14	3,780	will deepen
Standard Oil, No. 1 Martin, Torrance, Los Angeles	15- 4-14	3,759	P.B. 3,513
Imperial Gypsum, No. 1-C Torrance, Los Angeles	14- 4-14	3,750	redrlg. 1,940
Imperial Gypsum, No. 2 Getty, Torrance, L. Angeles	14- 4-14	3,785	idle
Lakeside Oil, No. 1 Cook, Torrance, Los Angeles	14- 4-14	4,998	pump 175 b.d.
Coast Line Oil, No. 1 McBride, Torrance, L. Angeles	14- 4-14	5,006	pump 60 b.d.
C. C. M. O., No. 14 Torrance, Los Angeles	14- 4-14	4,860	hd. sh. drlg.
C. C. M. O., No. 23 Torrance, Los Angeles	14- 4-14	3,770	P.B. 3,484
Fisher, N., No. 1 Washburn, Torrance, Los Angeles	23- 4-14	5,147	pump water
Berken Oil, No. 1 Star, Torrance, Los Angeles	16- 4-14	3,758	rigged up
Shell Oil, No. 94 Reyes, Dominguez, Los Angeles	33- 3-13	6,870	sd. sh. drlg.
Union Oil, No. 58 Callender, Dominguez, Los Angeles	33- 3-13	7,594	sd. sh. drlg.
Union Oil, No. 59 Callender, Dominguez, Los Angeles	33- 3-13	6,960	sd. sh. drlg.
Union Oil, No. 60 Callender, Dominguez, Los Angeles	33- 3-13	6,897	sd. sh. drlg.
Barnsdall Oil, No. 20 O'Dea, Rosecrans, Los Angeles	18- 3-13	7,750	sd. sh. drlg.
Union Oil, No. 19 Rosecrans, Rosecrans, Los Angeles	18- 3-13	1,864	sd. sh. drlg.
Universal Cons'd., No. 2 Trust, Rosecrans, L. Angeles	18- 3-13	7,601	flow 1,970 b.d.
St. Anthony Oil, No. 1 Gordon, Rosecrans, L. Angeles	18- 3-13	6,596	cleaning out
H. B. Oil, No. 1 Stephens, Rosecrans, Los Angeles	18- 3-13	6,033	will deepen
Barnsdall Oil, No. 3 S.F., Newhall, Los Angeles	26- 4-17	2,098	sd. sh. drlg.
West Coast Dev., No. 2 Broughton, Newhall, L. Ang.	27- 4-16	2,073	sd. sh. drlg.
General Pet., No. 33 Ford, Wilmington, Los Angeles	4- 5-13	2,526	O. S. drlg.
General Pet., No. 38 Ford, Wilmington, Los Angeles	4- 5-13	1,864	sd. sh. drlg.
General Pet., No. 39 Ford, Wilmington, Los Angeles	4- 5-13	4,101	cleaning out
General Pet., No. 3 Harbor, Wilmington, Los Angeles	2- 5-13	2,575	sd. sh. drlg.
General Pet., No. 10 Harbor, Wilmington, L. Angeles	2- 5-13	3,784	O. S. drlg.
General Pet., No. 11 Harbor, Wilmington, L. Angeles	2- 5-13	2,710	O. S. drlg.
General Pet., No. 15 Harbor, Wilmington, L. Angeles	2- 5-13	3,889	O. S. drlg.
General Pet., No. 6-S.P., Wilmington, Los Angeles	2- 5-13	2,580	sd. sh. drlg.
Bankline Oil, No. 3-U.P., Wilmington, Los Angeles	3- 5-13	3,895	flow 4,510 b.d.
Bankline Oil, No. 6-U.P., Wilmington, Los Angeles	2- 5-13	3,626	O. S. drlg.
Baker Oil, No. 1 Wilmington, Los Angeles	35- 4-13	3,078	cmtd. 3,077
Caleb Pet., No. 1 F.H., Wilmington, Los Angeles	32- 4-13	2,990	sd. sh. drlg.
Dunlap Oil, No. 11 Wilmington, Los Angeles	2- 5-13	3,860	O. S. drlg.
Hogan Pet., No. 1 Graham, Wilmington, Los Angeles	2- 5-13	3,990	sd. sh. drlg.
Hancock Oil, No. 5-A Wilmington, Los Angeles	3- 5-13	4,047	flow 4,020 b.d.
Hancock Oil, No. 14-A Wilmington, Los Angeles	3- 5-13	1,996	sd. sh. drlg.
Hancock Oil, No. 9-B Wilmington, Los Angeles	2- 5-13	3,380	O. S. drlg.
Hancock Oil, No. 11-B Wilmington, Los Angeles	2- 5-13	1,140	sd. sh. drlg.
Hancock Oil, No. 8-F Wilmington, Los Angeles	2- 5-13	2,350	sd. sh. drlg.
Kreiger Oil, No. 2 K.W., Wilmington, Los Angeles	32- 4-13	3,670	O. S. drlg.
Michelin, Jas., No. 1 Com., Wilmington, Los Angeles	33- 4-13	2,616	sd. sh. drlg.
Richfield Oil, No. 1-G Wilmington, Los Angeles	2- 5-13	6,078	P.B. 2,970
Richfield Oil, No. 2-P.D., Wilmington, Los Angeles	2- 5-13	1,380	sd. sh. drlg.
Richfield Oil, No. 3-P.D., Wilmington, Los Angeles	2- 5-13	2,197	sd. sh. drlg.
Richfield Oil, No. 26-P.D., Wilmington, Los Angeles	2- 5-13	2,088	sd. sh. drlg.
Richfield Oil, No. 1-P.G., Wilmington, Los Angeles	2- 5-13	2,907	sd. sh. drlg.
Richfield Oil, No. 4-P.G., Wilmington, Los Angeles	2- 5-13	3,342	O. S. drlg.
Richfield Oil, No. 1-W.E., Wilmington, Los Angeles	2- 5-13	3,470	O. S. drlg.
Royalty Service., No. 6 Nelson, Wilmington, L. Ang.	33- 4-13	5,660	C.P. 5,549
Selegna Prod., No. 11 Wilmington, Los Angeles	33- 4-13	2,591	sd. sh. drlg.
Silvergate Oil, No. 1 Wilmington, Los Angeles	32- 4-13	2,487	sd. sh. drlg.
Superior Oil, No. 4-C Seaside, Wilmington, L. Angeles	4- 5-13	2,774	O. S. drlg.
Superior Oil, No. 17 B.B., Wilmington, Los Angeles	2- 5-13	1,871	sd. sh. drlg.
Superior Oil, No. 1 Leonard, Wilmington, L. Angeles	2- 5-13	2,810	O. S. drlg.
Texas Co., No. 3 Ref., Wilmington, Los Angeles	34- 4-13	2,690	sd. sh. drlg.
Termo Co., No. 1-D Wilmington, Los Angeles	3- 5-13	3,905	O. S. drlg.
Termo Co., No. 2-D Wilmington, Los Angeles	3- 5-13	3,900	flow 3,500 b.d.
Union Pacific R.R., No. 50 Wilmington, Los Angeles	34- 4-13	2,950	flow 1,410 b.d.
Union Pacific R.R., No. 72 Wilmington, Los Angeles	34- 4-13	3,984	O. S. drlg.
Union Pacific R.R., No. 81 Wilmington, Los Angeles	4- 5-13	2,180	sd. sh. drlg.
Union Pacific R.R., No. 83 Wilmington, Los Angeles	3- 5-13	3,781	O. S. drlg.
Union Pacific R.R., No. 3-E Wilmington, Los Angeles	3- 5-13	2,422	sd. sh. drlg.
Union Pacific R.R., No. 4-E Wilmington, Los Angeles	3- 5-13	1,981	sd. sh. drlg.
Union Pacific R.R., No. 5-E Wilmington, Los Angeles	3- 5-13	2,412	sd. sh. drlg.
Pioneer Petrol., No. 1 Irvine, Wilmington, L. Angeles	26- 4-13	2,240	sd. sh. drlg.
Johnston Drlg., No. 1 Pico, Montebello, Los Angeles	5- 2-11	4,560	sd. sh. drlg.
St. Helens Pet., No. 24-M Montebello, Los Angeles	2- 2-12	5,781	sd. sh. drlg.
St. Helens Pet., No. 25-M Montebello, Los Angeles	2- 2-12	4,699	sd. sh. drlg.
St. Helens Pet., No. 26-M Montebello, Los Angeles	2- 2-12	3,440	sd. sh. drlg.
Union Oil, No. 1 Paul Howard, Montebello, L. Angeles	2- 2-12	5,540	sd. sh. drlg.
Union Oil, No. 1 Wilcox, Montebello, Los Angeles	2- 2-12	3,482	sd. sh. drlg.
Standard Oil, No. 1 Harvey, Montebello, Los Angeles	2- 2-12	3,685	will deepen
McVicar & Rood, No. 1 Manz, Montebello, L. Angeles	2- 2-12	3,729	redrlg. 3,425
Brit. American Oil, No. 1 Pico, Los Angeles	12- 2-12	3,990	will deepen
Fullerton Oil, No. 5 Whittier, Los Angeles	25- 2-11	1,871	sd. sh. drlg.
Hilldon Oil, No. 1 Poole, North Long Beach, L. Ang.	13- 4-13	2,987	sd. sh. drlg.
Signal Oil, No. 1 P.E., North Long Beach, L. Angeles	13- 4-13	2,976	sd. sh. drlg.
Abrams, John, No. 1 Flood Control, Los Angeles	13- 4-13	4,644	fish bailer
Caminol Co., No. 1-8 Dominguez, Flood Control, L. A.	14- 4-13	2,197	sd. sh. drlg.
Kramildon Oil, No. 1 Long Beach, Los Angeles	13- 4-13	5,567	idle
Marvell Oil, No. 1 Long Beach, Los Angeles	19- 4-12	4,148	sd. sh. drlg.
Dunlap Oil, No. 13 Long Beach, Los Angeles	30- 4-12	2,640	sd. sh. drlg.
Shell Oil, No. 1 Goddard, Long Beach, Los Angeles	19- 4-12	3,520	bailing
Shell Oil, No. 44 Alamitos, Long Beach, Los Angeles	28- 4-12	3,570	sd. sh. drlg.
Yunker, C. F., No. 2 Barbara, Long Beach, L. Angeles	24- 4-13	3,665	sd. sh. drlg.
Standard Oil, No. 13-A Huntington, Los Angeles	36- 5-11	4,500	redrlg. 4,298
W. P. R. Oil, No. 3 Huntington, Orange	35- 5-11	7,410	P.B. 6,900
Brea Canyon Oil, No. 48 Brea Canyon, Orange	2- 3-10	2,700	sd. sh. drlg.
Standard Oil, No. 127 Murphy, West Coyote, Orange	18- 3-10	3,240	cmtd. 3,224
Standard Oil, No. 2 Bastanchury, W. Coyote, Orange	21- 3-10	5,230	sd. sh. drlg.
Standard Oil, No. 65 Emery, West Coyote, Orange	24- 3-11	3,159	hd. sd. drlg.
Standard Oil, No. 2-12 Coyote, East Coyote, Orange	22- 3-10	3,970	sd. sh. drlg.
Bartholomae Oil, No. 6 Sterns, East Coyote, Orange	22- 3-10	3,880	sd. sh. drlg.
Oliver & Owen, No. 1 Anderson, Yorba, Orange	22- 3- 9	1,363	rig to pump
Beverly Hills Pet., No. 1 Fricke, Yorba, Orange	21- 3- 9	1,914	cleaning out
Brown & Co., No. 1 Hurley, Yorba, Orange	22- 3- 9	1,823	P.B. 1,787
Burmah Oil, No. 1 Sloan, Yorba, Orange	21- 3- 9	2,231	sd. sh. drlg.
Signet Oil, No. 1 Kraemer, Yorba, Orange	21- 3- 9	1,947	pump 50 b.d.
Kelly & Son, No. 1 Yorba, Orange	21- 3- 9	976	sd. sh. drlg.
Congress Oil, No. 1-K, Santa Ana Canyon, Orange	36- 3- 9	3,010	deepening

KANSAS

Week Ending April 9 (Descriptions are East unless marked otherwise)

Barber County

Palmer Oil Corp. et al No. 1 Warwick, C NW sec. 29-31-10w. R.U.S.T. 4,787 ft.

Barton County

Crown Oil Co. No. 1 Schartz, NW sec. 7-20-11w. T.D. 3,352 ft.; 1,400 ft. O.I.H.

R. E. Day et al No. 1 Felts, SE SE NE sec. 14-16-12w. S.D. 1,875 ft.

Gear and Atlantic Ref. Co. No. 1 Sullivan, NE SE SW sec. 29-17-13w. Drlg. 3,250 ft.

Murfin et al No. No. 1 Rexroot, NW SE sec. 14-17-13w. Drlg. 2,000 ft.

C. L. Price No. 1 Hammeke, NE NE SW sec. 12-18-12w. Sil. 3,415-27 ft.; T.D. 3,433 ft.; P.B. 3,429 ft.; est. 20 B.O. P.D. and 2 B.W.

Price et al No. 1 Wondra, NW NE sec. 10-17-13w. U.R. 8-in. 2,485 ft.

Sinclair Prairie Oil Co. No. 1 Frederick, SW SW SE sec. 16-16-11w. Arb. 3,322 ft.; T.D. 3,346 ft.; rng. 5-in. csg.; W. O.C.

Butler County

T. S. Dustin No. 1 Miley, SE NW NE sec. 17-27-5e. C.O. 800 ft.

Saco Oil Co. et al No. 1 Pettit, SW NW SW sec. 21-28-6. Drlg. 2,000 ft.

Chase County

T. D. Duffy No. 1 Leedy, NE NW NW sec. 26-22-9. Drlg. 1,650 ft.

Cowley County

Bess & Gralapp et al No. 1 Hunt, CNL NE NW sec. 18-34-5e. Drlg. 1,875 ft.

Arthur Brewer No. 1 McDaniels, SW cor. sec. 24-30-4e. Drlg. 2,315 ft.

Palmer Oil Corp. No. 1 Houser, SE NW SW sec. 13-30-3e. Drlg. 300 ft.

Smith et al No. 1 Wilson, SE SW NW sec. 9-33-6. Drlg. 1,000 ft.

Earl Wakefield No. 1 White, NW NE sec. 4-33-4e. Drlg. 3,200 ft.

Dickinson County

Fred Franks et al No. 1 Huffman, NW NW sec. 11-13-1e. Rlg.

Ellis County

Carter Oil Co. No. 1 Foster, SE NW sec. 1-15-16w. T.D. 3,447 ft.; bailing.

Western Kansas O. & R. Co. et al No. 1 Cole, NE SE SE sec. 24-11-20w. Drlg. 3,425 ft.

Ellsworth County

Ralph Wixson et al No. 1 Peterman, SW cor. sec. 28-17-10w. T.D. 3,306 ft.; P.B. 3,300 ft.; acd.; 2½ B.O.P.H.

Finney County

Atlantic Ref. Co. No. 1 Nunn, C SE NE sec. 27-21-34w. Set whipstock 4,311 ft.

Ford County

Sinclair Prairie Oil Co. No. 1 Young, CSL NE sec. 34-27-21w. W.O.C. 313 ft.

Graham County

Continental Oil Co. and Cities Service Oil Co. No. 1 Morel, C W½ E½ NE sec. 15-9-21w. T.D. 3,720 ft.; swb. 192 B.O. in 4 hrs.

Greenwood County

C. C. Whitaker et al No. 1 Bressner, NW SE sec. 8-26-13e. S.D. 750 ft.

Harper County

Franklin Drlg. Co. No. 1 Walts, NE SW sec. 24-34-6w. Drlg. 5,175 ft.

Jackson County

Lemmick Oil Co. No. 1 Marble Bank, C NE NE sec. 26-9-14. Drlg. 900 ft.

Jewell County

Hollingsworth Bros. No. 1 Wolfe, NE SW SE sec. 14-4s-8w. S.D. 100 ft.

Lane County

Phillips Pet. Co. No. 1 Kees, C SE SE sec. 3-19-30w. T.D. 4,911 ft.; S.D.

McPherson County

Darrah et al No. 1 Decker, SW SW SE sec. 12-21-2w. T.D. 3,440 ft.; U.R.

Meade County

Barnett et al No. 1 Adams, NW SE sec. 22-34-30w. S.D. 69 ft.

Bryan & West No. 1 Brown, NE SW sec. 5-33-27w. Spd. and S.D.

Ness County

Trojan O. & G. Co. No. 1 Moses, C SW NW sec. 10-18-25w. S.D. 500 ft.

Trojan O. & G. Co. No. 1 Page Milling Co. SE SE NW sec. 36-18-26w. S.D. 3,270 ft.

Pratt County

Atlantic Ref. Co. No. 1 Rice, NW NE NW sec. 11-28-15w. Spd.

Reno County

Amerada Pet. Corp. and Westgate-Greenland Oil Co. No. 1 Johns, SE cor. sec 25-22-5w. R.U.S.T. 3,902 ft.; pot. 912 B.O.

Carey et al No. 1 McPheeters, NE NW sec. 22-26-8w. U.R. 6-in. 3,830 ft.

McCole et al No. 1 Mathews, SW NW NW sec. 15-24-10w. U.R. 8-in. 3,388 ft.

Rice County

Marylyn Oil Co. et al No. 1 Vincent, NW NW NE sec. 5-21-10w. Rlg.

Price et al No. 1 Gemeinhardt, NE SE sec. 18-18-10w. T.D. 3,305 ft.; P.B. 3,298 ft.; pmpd. 15 B.O. and 25% wtr. daily.

Rooks County

Carter Oil Co. No. 1 Leist, SW cor. sec. 10-8-17w. Drlg. 2,095 ft.

Graham et al No. 1 Fike, SW cor. sec. 9-9-17w. C.O. 3,384 ft.

Producers Oil Co. No. 1 Ham, SW SW NW sec. 25-7-19w. Set 12-in. 312 ft. cor.); S.D. 350 ft.

Russell County

Gulf Oil Corp. No. 1 Punker, C E½ NW SW sec. 22-15-12w. T.D. 3,324 ft.; S.D.O.

Jones & Shelbourne et al No. 1 Kuhnle, SE NW sec. 4-15-12w. Cmtd. 8-in. 3,033 ft., T.D.; O.I.H.; W.O.C.

Lauck & Moncrief No. 1 Miller, NE NW NW sec. 29-13-14w. Drlg. 2,630 ft.

S. L. Parks No. 1 Gorham, SW SW NE sec. 19-15-15w. S.O. 3,105 ft.; drlg. 3,300 ft.

Simpson et al No. 1 Boxberger, NE SE NW sec. 10-15-14w. U.R. 5-in. 3,210 ft.

Smith & Unruh No. 1 Stielow, NW cor. sec. 32-11-14w. Fsg. 2,254 ft.

G. A. Stearns et al No. 1 Stielow, NW cor. sec. 32-11-14w. S.D. 2,254 ft.

Sedgwick County

Frank Hudson et al No. 1 Fulton, NE SE sec. 35-28-1e. S.D. 1,738 ft.

McKnab No. 1 Garrett, SE SW SW sec. 18-29-2e. Drlg. 3,130 ft.

Union O. & R. Co. et al No. 1 Howell, SW

cor. sec. 6-29-1e. Set 10-in. 2,298 ft.; recmtd.

Stafford County

Cardinal Oil Co. et al No. 1 Fischer, SW NW SW sec. 31-21-12w. Drlg. 2,636 ft.
Continental Oil Co. et al No. 1 Fair CNL SW sec. 12-25-13w. T.D. 4,163 ft.; swb. 52 B.O.P.H.; tstg.
Continental Oil Co. and Phillips Pet. Co. No. 1 Curtis, SE cor. sec. 26-24-13w. Drlg. 3,700 ft.
National Ref. Co. No. 1 Bonham, SW SE sec. 28-25-12w. T.D. 4,213 ft.; acd.; pmpd. 13 B.O.P.H.
Pryor & Lockhart No. 1 De Selms, NE sec. 3-25-11w. T.D. 4,100 ft.; S.D.O.

Sumner County

Hapenny et al No. 1 Evers, SE SE NE sec. 27-31-2e. O.W.D.D.; drlg. 1,700 ft.
Murphy et al No. 1 Tate, SE NW sec. 31-32-2e. T.D. 173 ft.; W.O.C.
Saco Oil Co. et al No. 1 Phipps, SW SE NE sec. 24-30-1w. Drlg. 3,075 ft.
Shawver and Pryor & Lockhart et al No. 1 McKowen, SW cor. sec. 18-32-1w. T.D. 3,741 ft.; R.U.S.T.

Woodson County

Craft No. 1 Pratt, NW SW sec. 36-26-15. Drlg. 1,500 ft.
Union O. & R. Co. No. 1 Laidlow, CEL NW SW sec. 35-25-15e. Miss. 1,397-1,400 ft.; T.D. 1,404 ft.; C.O.

OKLAHOMA

Week Ending April 9

NORTHERN OKLAHOMA

Beckham County

Mid-American Oil Co. No. 1-A Biscoe, SW cor. sec. 28-8-22w. T.D. 2,708 ft.; U.R.

Cleveland County

W. A. Delaney et al No. 1 Bugher, SE SE SW sec. 12-7-2w. Drlg. 5,853 ft.

Comanche County

Clyde Roach No. 1-A Green, SE SE SW sec. 2-1n-13w. T.D. 670 ft.; S.D.

Creek County

M. W. Mosier et al No. 1 Holcomb, SE SW NW sec. 19-18-8. T.D. 3,018 ft.; 2,000 ft. W.I.H. and S.S.O.; S.D.

Garfield County

H. R. Hollenback et al No. 1 Clark, NW cor. sec. 34-21-6w. Second Wilcox 7,298 ft.; T.D. 7,336 ft.; flwd. by hds., avg. 200 B.P.D.; comp.
J. E. Kendall et al No. 1-A State, SW cor. sec. 13-23-3w. Spd.

Garvin County

B. C. D. Edwards No. 1 Clark, NE cor sec. 16-3n-3e. T.D. 2,676 ft.; shot; P. 20 B.O. and 75 B.W. in 24 hrs.; tstg.
First Natl. Oil Co. No. 1 Butterly, NE NE SE sec. 22-1n-1e. Set surf. csg. 40 ft.; T.D. 45 ft.

Grady County

Doyle Pet. Co. No. 1 Huffine, NW NW SE sec. 30-5-8w. Loc. abd.
Gulf Oil Corp. No. 1 Thomas, SW NW NW sec. 14-4-5w. T.D. 11,415 ft.; pipe stuck.

Greer County

J. H. Everitt No. 1 Graumann, NE NW NW sec. 11-5-21w. T.D. 550 ft.; U.R.
R. W. McDonald No. 1 Fite, SE SE sec. 34-7-21w. T.D. 1,114 ft.; H.F.W.; S.D.

Hughes County

Amerada Pet. Corp. and Stanolind O. & G. Co. No. 1 Preame, NW NW SE sec. 29-9-9. Drlg. cmt.; T.D. 3,395 ft.; P.B. 3,364 ft.; W.O.C.
Homer Doup et al No. 1 Bank, NE NE NW sec. 7-7-9. Drlg. by tools at 370 ft.
E. H. Moore et al No. 1 Hunter, NE NE NW sec. 30-4-9. Drlg. 3,260 ft.
Phillaine Oil Co. No. 1 Morrison, SE SE SW sec. 13-9-10. T.D. 3,169 ft.; S.O.
Phillips Pet. Co. No. 1 Becker, NE NW SW sec. 8-5-10. T.D. 6,286 ft.; plug. 5,612 ft.; drld. out to 5,660 ft.; flwd. 206 B.F. in 16½ hrs.; ½-in. ck.
Troup & Strickland No. 1 Brown, NW SW NE sec. 32-6-8. S.D. 660 ft.

Kay County

J. R. Pierse No. 1 Hannon, SE cor. sec. 26-28-2e. T.D. 2,000 ft.; S.D.
E. J. Shaffer et al No. 1 McKee, NE NW sec. 20-28-1w. T.D. 2,500 ft.; S.D.

Kiowa County

Anderson-Prichard Oil Corp. No. 1 Hancock, SE SE NW sec. 23-6-15w. T.D. 803 ft.; abd.
Anderson-Prichard Oil Corp. No. 1 Johnson, sec. 10-7-20w. Drlg. 30 ft.
Gauntt & Baker No. 1 Parks, NW NW SW sec. 29-7-20w. S.D. 720 ft.

Lincoln County

Wilcox O. & G. Co. No. 1 Evans, SW SW NW sec. 21-14-6. T.D. 3,106 ft.; R.U.S.T.
Wilcox O. & G. Co. No. 1 Royer, SE SE NE sec. 18-14-6. T.D. 3,372 ft.; S.O.& W.; S.D.

Logan County

Carter Oil Co. No. 1 Lydick, C E½ NW NE sec. 23-15-4w. Drlg. 4,810 ft.

Muskogee County

Midco Oil Corp. No. 1 Dunagan, SE SE NE sec. 31-11-19. Drlg. 1,600 ft.

Okfuskee County

Alma Oil Co. No. 1 Martin, SW cor. sec. 4-12-7. Drlg. 2,020 ft.
Burke-Greis Oil Co. No. 1 Capps, SE cor. sec. 7-13-7. T.D. 3,227 ft.; R.U.S.T.

Osage County

Chevalier-Simon No. 1 Osage, NW NW SW sec. 33-27-5. Drlg. 1,760 ft.
Norbla Oil Co. No. 1 Osage, SE cor. sec. 18-25-7. S.D. 1,129 ft.; W.O. water.

Payne County

R. L. Kemp et al No. 1 Rafferty, SE SE NE sec. 6-18-5. T.D. 3,666 ft.; H.F.O. in 12 hrs.; fsg.
Marydun Oil Co. et al No. 1 Moore, SE SW NW sec. 17-18-1e. T.D. 5,225 ft.; D.&A.
Sun Oil Co. & Loffland Bros. No. 1 Scafe, SE SE NE sec. 12-18-1e. Drlg. 3,470 ft.

Pontotoc County

Caloma Oil Corp. No. 1 Brents, SE NE SW sec. 4-1n-6. Drlg. 1,574 ft.
Cowley et al No. 1 McCormick, NW SW SW SE sec. 27-2n-4e. T.D. 330 ft.
Jack Lynch et al No. 1-A Parker, SW SW SE sec. 17-4-8. Drlg. 2,780 ft.
Union Dev. Co. No. 1 Abbott, SW NW NE sec. 34-3-6. T.D. 3,320 ft.; S.D.

Pottawatomie County

Mid-Continent Pet. Corp. et al No. 1 Smith, NE SE SW sec. 31-7-4. Drlg. 2,664 ft.

Seminole County

C. E. Davis et al No. 1 Jones, NW NE SW sec. 34-6-5. T.D. 2,314 ft.; P.B. 2,307 ft.; 75 B.O. and 15 B.W. in 24 hrs.; pmpg.
W. A. Delaney et al No. 1 Swan, SE SW SW sec. 18-6-6. Cellar and pits.
W. B. Pine No. 1 Wright, SE SE NE sec. 16-6-6. P.B. 3,657 ft.; W.O.C.
Summitt Drlg. Co. No. 1 Wass, SE NE NE sec. 30-8-7. Drlg. 4,185 ft.
W. A. Villines et al No. 1 Swan, NW NE NW sec. 26-7-5. T.D. 3,001 ft.; flwd. 37 B.F. in 6 hrs. through tbg.
H. V. Woodson and Marydun Oil Co. No. 1 Gilliland, SE SW sec. 24-11-7. T.D. 4,295 ft.; M.I.T.

Texas County

Hagey et al No. 1 Peck, C NE sec. 6-1n-13ecm. T.D. 2,895 ft.; to acdz.
Hardendorf & Kuhn No. 1 Wiggin, C NW sec. 1-2n-14ecm. T.D. 2,763 ft.; 15,400,000 ft. gas; comp.
Hardendorf & Kuhn No. 2 Wiggin, C NE sec. 2-2n-14ecm. Drlg. 1,600 ft.

Washita County

L. B. McWhirter No. 1 fee, NW SW SW sec. 34-8-19w. T.D. 2,147 ft.; fsg.

SOUTHERN OKLAHOMA

Atoka County

Amerada Pet. Corp. and Stanolind O. & G. Co. No. 1 Ridgway, NE cor. sec. 24-3s-9. Drlg. 4,013 ft.
C. M. Sheldon and Gardner Pet. Co. No 1 Lee, NE NW SW sec. 2-4s-10e. Drlg. 2,578 ft.

Carter County

Texas Co. No. 1-B Cathey, SE NE NE sec. 6-5s-1w. Core 5,439-58 ft.; S.O.&G.

Cotton County

Jim Turner et al No. 3 Collins, SE SE NE sec. 18-4s-10w. Loc.

Johnston County

W. T. Sheldon No. 1 Chapman, C NW NW sec. 26-4s-6e. T.D. 3,176 ft.; abd.

Love County

Sinclair Prairie Oil Co. No. 1 Peabody, NE cor. sec. 35-6s-2w. Drlg. sd. 5,640 ft.

Marshall County

Paul Robb et al No. 1 Vittitoe, C NE SE sec. 11-5s-4e. T.D. 5,473 ft.; rng. csg.

Stephens County

Coline Oil Co. No. 1 Johnson, C SW SE SE NE sec. 1-2n-8w. T.D. 10,000 ft.; P.B and drld. to 9,086 ft.; run 2½-in. tbg.; S.O.
Helmerich & Payne No. 1 Mauersberger, C S½ SW SE sec. 29-2n-8w. T.D. 5,512 ft.; to deepen.

Tillman County

H. I. Grimes et al No. 1 Hall, SW NE SW sec. 12-3S-19w. T.D. 4,020 ft. abd.
Russell & Ray No. 1 Hasley, NW NE NW sec. 4-1s-19w. Drlg. 1,730 ft.
Smith No. 2 Hammell, NE NW NW sec. 6-5s-15w. Drlg. 2,000 ft.

LOUISIANA

NORTH LOUISIANA PROVEN

Caddo—Bodcau

Gulf Oil Corp. No. 2 Allison, sec. 3-23-16. Drlg. sh.&L. 4,987 ft.
J. S. Rushing No. 1 Zylks, sec. 10-23-16. Drlg. ch. rk. 2,500 ft.
Shell Pet. Corp. No. 2-B U. S. Govt., SE cor. sec. 3-23-16. Set 5-in. csg. 5,984 ft.; T.D. 5,988 ft.
Shell Pet. Corp. No. 3-B U. S. Govt., sec. 3-23-16. Cg. 5,968 ft.
Shell Pet. Corp. No. 4-B U. S. Govt., sec. 3-23-16. Set 5-in. csg. 6,002 ft.; T.D. 6,003 ft.
Shell Pet. Corp. No. 5-B U. S. Govt., sec. 3-23-16. Drlg. L. 3,640 ft.

N. LOUISIANA WILDCATS

Bienville Parish

Gulf Ref. Co. No. 1 Goodpine, sec. 25-14-8. Drlg. sd.&sh. 9,343 ft.
Producers O. & G. Co. No. 1 Locke, NE cor. sec. 9-15-10. O.W.W.O.: old T.D. 2,960 ft.; rmd. to 800 ft.; S.G.; arng. to D.D.

Bossier Parish

Premier Inv. Co. No. 1 McDade, SE SW NE sec. 28-19-11. Drlg. sh. 2,022 ft.
Sloan, Lloyd et al No. 1 Sherrill, sec. 12-19-12. S.D. 508 ft.; rep. rig.
Triangle Drlg. Co. No. 3-A Herold, NE SW sec. 13-17-12. R.U.
Union Prod. Co. No. 2-C Skannel, sec. 13-17-12. T.D. 3,121 ft.; 7-in. at 3,091 ft.; arng. to acdz.

Caddo Parish

Carroll et al No. 1 Hart, NW sec. 26-21-16. R.U.
W. D. Chew No. 3 U. S. Govt., NW sec. 5-20-16. O.W.W.O.; old T.D. 961 ft.; comp.; pmpg. 20 B.P.D.; T.D. 2,307 ft.
J. P. Driscoll No. 2 Sattelite, sec. 10-20-15. Drlg. 1,310 ft.
W. D Flynn No. 3 Natalie, SW cor. sec. 10-21-16. T.D. 1,029 ft.; comp.; pmpg. 5 bbls. oil and 60 bbls. S.W. per day.
W. D. Flynn No. 4 Natalie, SE cor. sec. 10-21-16. Set 7-in. at 998 ft.; W.O.
W. H. Harrison, Jr., No. 3 Crystal Shoreline, SW cor. SW NW sec. 25-21-16. Set 4-in. csg. 2,255 ft.; T.D. 2,264 ft.; comp.; pmpg. 15 B.P.D.
J. T. Humphrey No. 1 Caddo Levy Bd., sec. 26-21-16. Drlg. sh. 1,310 ft.
La. Oil Prod. Co. No. 14-B Muslow, sec. 4-20-15. Set 6-in. csg. 2,148 ft.; tstg.: T.D. 2,154 ft.; swbg. 35 B.P.D.; comp.
Magnolia Pet. Co. No. 24 Dillon Hrs., sec. 23-21-15. Set 7-in. csg. 1,446 ft.; tstg. 1,635 ft.
Pet. Heat & Power Co. No. 3 Stiles, sec. 33-21-16. Set 6-in. at 948 ft.; T.D. 958 ft.; tstg.
Petroleum Heat & Power Co. No. 1 Wemple, NW cor. sec. 14-20-15. Set 6-in. csg. 2,185 ft.; T.D. 2,239 ft.; W.O. tstd. S.W.
W. G. Ray Drlg. Co. No. 5 Hunter, NE cor. sec. 17-19-14. T.D. 2,451 ft.; set 4½-in. csg.; comp.; pmpg. 5 B.O. and 300 B. S.W. per day.
G. R. Stevens No. 3 Hart, sec. 22-21-16. Drlg. sh. 875 ft.
Tippett Oil Corp. No. 1 Lewis, sec. 27-20-16. Drlg. sd. 1,855 ft.
Triple M Oil Co. No. 1 Boisseau, sec. 34-21-16. S.D.; W.O. 1,853 ft.
Williams & Long No. 1 Stiles, sec. 20-21-16. Tstd. dry 1,023 ft.; D.&A.; S.W. 1,039 ft.

Claiborne Parish

Atlantic Ref. Co. No. 1 English, sec. 29-21-4. Set 5½-in. csg. 5,223 ft.; tstg. 5,243 ft.
Gulf Oil Corp. No. 1 Whitman, sec. 2-20-5. Drlg. L.&sh. 4,181 ft.
Hollifield & McFarland No. 4 Patton Est., sec. 2-20-5. Cg. 4,195 ft.
T. L. James No. 3 Fowler, C NW SE sec. 32-21-4. R.U.
Magnolia Pet. Co. No. 1 Lloyd, NW SE sec. 2-20-5. Set 10-in. csg. 825 ft.
W. H. North No. 1 Patton Est., sec. 11-20-5. Set 5½-in. csg. 5,324 ft.; comp.; 14 B.P.H. on 14/64-in. ck.; T.D. 5,347 ft.
E. T. Oakes et al No. 1 Whitman, sec. 2-20-5. Drlg. sh. 4,324 ft.
C. R. Schuster No. 1 Kilgore, sec. 28-21-15. R.U.; S.D.
Union Prod. Co. No. 2 Brownfield, sec. 5-19-5. T.D. 9,964 ft.; sh.; recmtd. back to 8,850 ft.; rmg. bridge at 8,475 ft.; drlg. sh. 10,160 ft.
Union Prod. Co. No. 1 Coleman, sec. 43-7-9e. Drlg. rd. bds. 3,666 ft.
G. H. Vaughn No. 1 Eppinger, C SW NE sec. 30-21-4. Comp.; 48 B.P.H. on 1-in. ck.; 5½-in. csg. 5,118 ft.
Weaver Oil Corp. No. 2 Edmonds, sec. 16-20-5. Fsg. D.S. 4,240 ft.

De Soto Parish

S. S. Alexander No. 1 Stoll, NE cor. sec. 5-12-16. O.W.W.O.: old T.D. 6,002 ft.; set short string 5½-in. csg. 5,479 ft. and will perf.
La. Seaboard Oil Ref. Co. No. 1 Lawrence, sec. 36-12-14. D.S.T. 2,038-62 ft.; tstd. 80 jts. mud cut with oil in 20 min.; arng. to core ahead.
Paul Miller No. 1 Jal Drlg. Co., C sec. 7-11-11. Drlg. sh. 800 ft.
Pet. Heat & Power Co. No. 1 DeSoto Corp., SE cor. SW NW sec. 7-11-11 Missed sd.; T.D. sh. 2,868 ft.; P.B. 2,000 ft.; to whipstock.
Pet. Heat & Power Co. No. 1 Matthews, sec. 29-12-11. Old T.D. 4,003 ft.; P.B. 3,950 ft.
Pet. Heat & Power Co. No. 1 Sample, sec. 29-12-11. Set 7-in. csg. 2,680 ft.; perf. 2,649-59 ft.; tstd. some oil and little gas; W.O.
Pet. Heat & Power No. 1 Williams, W. R., NW NE sec. 13-11-12. (Cor.); D.S.T. 2,800-18 ft.; S.G.; 7-in. csg. set 2,800 ft.; tstg. 2,827 ft.; W.O.; T.D. 2,827 ft.
Texas Co. No. 2 White, SW NE sec. 24-12-12. Set 4½-in. csg. 835 ft.; tstd. dry; S.G.; W.O.; T.D. 890 ft.

Franklin Parish

Southern Star Pet. Co. No. 2 Grayson, NE cor. NE SE sec. 36-12-6e. D.&A. 1,754 ft.

Grant Parish

C. L. Thompson No. 1 McNeely Est., NE cor. sec. 10-6-3w. R.U.

La Salle Parish

Alexander & Jarvis No. 1 Tremont, sec. 2-9-1e. S.D. 1,521 ft.
Cupples et al No. 1 King, sec. 25-10-1e. S.D. and W.O. 1,541 ft.
Pet. Heat & Power Co. No. 2 Wright, sec. 26-10-1e. Drlg. 1,400 ft.

Lincoln Parish

F. H. Brown No. 2 Patton, C S½ SE SW sec. 6-20-4. Abd.; will not drill.
Lyons & Neely No. 1 Brazzill, C SE NW sec. 17-20-4. R.U.
Magnolia Pet. Co. No. 2 Patton, sec. 7-20-4. Drlg. L.&sh. 4,312 ft.
Magnolia Pet. Co. No. 3 Pollock, C N½ SW SE sec. 5-20-4. Drlg. sh. 2,400 ft.

Morehouse Parish

W. J. Furlong No. 1 Clark, sec. 10-20-7e. Set 9⅝-in. csg. 2,805 ft.; top Big L. 6,207 ft.; S.D. hd. L. 7,023 ft.

Red River Parish

Glassell & Whitehurst No. 1 LeLong, NE NW NE sec. 25-12-11. S.D. 2,874 ft.
Yandell Rogers No. 5 Gaspair, SE SW sec. 27-13-11. Set 5½-in. csg. 2,453 ft.; T.D. 2,474 ft.; W.O.S.R.

Sabine Parish

H. N. Morris No. 1 Irving & Bishop, C NW NW sec. 18-7-12. S.D.; will set csg. 2,000 ft.
Pearl Oil Corp. No. 7 Cranford, SW cor. SW SE sec. 20-9-13. Set 6-in. at 1,475 ft.; acdzd.; T.D. 1,690 ft.; comp.; 10 B.P.D.
Plymouth Oil Corp. No. 1 Kezerie, sec. 3-7-13. Drlg. sh. 1,615 ft.
W. L. Posey No. 1 Ramirez, C NW NW sec. 12-7-13. Set 6-in. csg. 2,111 ft.; tstd.; bailing to test 2,555 ft.
Republic Gas Co. No. 1 Whitney Corp., sec. 8-9-13. O.W.W.O.; old T.D. 8,510 ft.; R.U. to D.D.
Royal O. & G. Co. No. 3-A Frost Lbr. Co., C NE SE sec. 19-9-13. R.U.
Sutton-Zwolle Oil Co. No. 1 Sabine Lbr. Co., SE cor. NW NE sec. 23-7n-14w. Set 9⅝-in. csg. 2,215 ft.; D.S.T. 3,843-53 ft.; rec. 1,200 ft. P.L.O. 9 min.; W.P. 275 lbs.; T.D. 3,865 ft.; set 7-in. csg. 3,846 ft.; T.D. 3,857 ft.; acdzd. with 750 gals.; tstd. some oil; reacdzd. with 3,000 gals. and tstd. dry; W.S.O.

Tensas Parish

H. V. Schumacker No. 4 Mount Plantation, sec. 39-11-12e. D.S.T. 1,025-47 ft.; rec. S.W.; fsg. core bbl.

Union Parish

Standard Oil Co. of La. No. 1 Frost Lbr., sec. 14-21-1e. Drlg. sh. and stks. L. 8,591 ft.

Webster Parish

Fohs Oil Co. No. 1 Crichton, sec. 33-21-10. Drlg. L.&sh. 4,786 ft.
Hunt Oil Co. No. 6 Babb, C NE SW sec. 14-21-10. Set 9⅝-in. csg. 5,971 ft.; T.D. 6,012 ft.
Hunt Oil Co. No. 7 Babb, C NW SE sec. 14-21-10. R.U.
Hunt Oil Co. No. 8 Davis, C NW NE sec. 23-21-10. Top Tr. Pk. 5,646 ft.; comp.; 50 B.P.H. on ½-in. ck.; Holloway sd. 5,560-74 ft.; perf. 5,560-74 ft.
Hunt Oil Co. No. 19 Hope, NW cor. sec. 24-21-10. T.D. 6,385 ft.; 5-in. at 6,010 ft.; sec. Holloway sd. 5,824-32 ft.; perf. 5,820-30 ft.; tstd. dry; comp.; 53 B.P.H. on ½-in. ck.
Hunt Oil Co. No. 3 Webb, C NW SW sec. 13-21-10. R.U.
Magnolia Pet. Co. No. 1 Coyle-Tiner, C sec. 21-21-10. Drlg. sd.&L. 7,663 ft.
Magnolia Pet. Co. No. 1 Sexton Unit, NW SE sec. 32-23-9. Cd. Bodcaw sd.; no show; cd. sd. 8,293-8,310 ft.; gas odor; slight show gas and dist.; cg. hd. sdv. L. 8,599 ft.; ran Schlumberger 8,521 ft.; cd. sd. 8,899-8,906 ft.; gas odor; sd. at 9,007 ft.; dist. odor; drlg. ahead to Big lime.
Midstates Oil Corp. No. 1 Welori Lbr. Co., C NW NW sec. 3-20-10. Drlg. sh.&L. 5,410 ft.
Morgan et al No. 1-A Hope, C NW NW sec. 25-21-10. Top Tr. Pk. 5,576 ft.; Holloway sd.; odor gas 5,600-08 ft.; set 9⅝-in. csg. 5,829 ft.; drlg. 5,860 ft.
North American Oil Consol. Co. No. 1 Stewart, C SE NE sec. 32-27-10. T.D. 8,469 ft.; set 7-in. 8,411 ft.; comp.; 840 B.P.D.; dist.; ½-in. ck.; est. 10,000,000 ft. gas.
North American Oil Consol. Co. No. 2

Stewart, C NE NE sec. 32-21-10. R.U.
Ohio Oil Co. No. 3 Bodcaw, Acct. 4, sec. 28-21-10. Set 9⅝-in. csg. 5,673 ft.; tstg. 5,794 ft.
Ohio Oil Co. No. 49 Bodcaw (Acct. 3), C NW NW sec. 34-21-10. Set 13⅜-in. csg. 808 ft.; drlg. sd. 7,480 ft.
Ohio Oil Co. No. 1 Crutsinger, NE cor. sec. 35-2-10. Drlg. hd. sd. 7,418 ft.
Ohio Oil Co. No. 1 Gray, NW cor. SE NW sec. 28-21-10. Cg. 5,740 ft.
Ohio Oil Co. No. 24 Gray, NE cor. sec. 35-21-10. Set 9⅝-in. csg. 5,630 ft.
Ohio Oil Co. No. 1 A. H. Gray, Acct. 3, sec. 26-21-10. Set 13⅜-in. csg. 815 ft.
Ohio Oil Co. No. 5 Holloway, NE cor. SE NE sec. 23-21-10. Cg. 5,765 ft.
Ohio Oil Co. No. 1 Jackson, sec. 27-21-10. Drlg. sh. 3,140 ft.
Ohio Oil Co. No. 1 Sandlin, sec. 27-21-10. Drlg. sh. 3,395 ft.
Oliphant No. 3 Banks, sec. 34-21-10. Top Tr. Pk. 5,797 ft.; Holloway sd. 5,830 ft.; 2nd Holloway sd. 5,973-89 ft.; dry; cg. 6,093 ft.
A. G. Oliphant No. 2 Hodges, C NW SE sec. 34-21-10. R.U.
A. G. Oliphant No. 1 Stewart, sec. 33-21-10. Holloway sd.; no show; drlg. sdy. sh. 6,808 ft.
Stanolind O. & G. Co. No. 1 Pardee Co., SW NE sec. 36-21-10. Drlg. sd.&L. 6,930 ft.
Union Prod. Co. No. 1 Stewart, SE cor. SE sec. 28-21-10. Bodcaw sd. 8,269-8,319 ft.; set 7-in. csg. 8,270 ft.; T.D. 8,325 ft.

SOUTH LOUISIANA FIELDS

Abbeville—Vermilion Parish

Continental Oil Co. No. 1 Hebert, sec. 67-12s-3e. 10¾-in. csg. 1,510 ft.; T.D. 7,448 ft.; D.S. stk.; fsg.
Continental Oil Co. No. 1 Motty, sec. 67-12s-3e. Drlg. sh. 1,530 ft.

Anse La Butte—St. Martin Parish

Y. D. Spell No. 1 Deborah, sec. 117-9s-5e. T.D. 960 ft.; W.O.S.R.

Baton Rouge—East Baton Rouge Parish

Wm. Helis No. 3 La. State, sec. 65-7s-1w. R.U.

Bay St. Elaine—Terrebonne Parish

F. J. LeBlanc No. 2 Wurzlow, sec. 17-22s-18e. S.D. 816 ft.
Texas Co. No. 16 State, sec. 12-22s-17e. Drlg. sh. 5,178 ft.

Bayou Blue—Iberville Parish

Humble O. & R. Co. No. 6 Wilbert Sons Lbr. Co., sec. 66-9s-11e. Drlg. sd. 6,567 ft.

Bayou Cocotrix—Terrebonne Parish

Shell Pet. Corp. No. 5 Pelican. 10¾-in. csg. 2,480 ft.; T.D. 5,490 ft.; I.P. 528 B.P.D.; 12/64-in. ck.
Shell Pet. Corp. No. 5-B Realty Co. Drlg. sh. 7,445 ft.

Bayou De Allemands—St. Charles Parish

Amerada Pet. Corp. No. 1 Gheens Realty Co., sec. 56-15s-20e. T.D. 7,010 ft.; P.B. to straighten hole.
Amerada Pet. Corp. No. 4 State, sec. 13-15s-20e. R.U.

Big Lake—Cameron Parish

Union Sulphur Co. No. 2 Miami Corp., sec. 19-12s-8w. T.D. 7,924 ft.; P.B. 7,650 ft.; to sdtrk.; drlg. sh. 9,146 ft.

Black Bayou—Calcasieu Parish

Shell Pet. Corp. No. 41 Watkins, sec. 17-12s-12w. Spd.

Caillou Island—Terrebonne Parish

Texas Co. No. 1 L.L.&E., sec. 18-23s-20e. T.D. 5,310 ft.; P.B. and sdtrkd.; drlg. sd.&sh. 4,425 ft.

Cameron Meadows—Cameron

Burton-Sutton Oil Co. No. 23 School Ld., sec. 16-14s-13w. Drlg. sh. 4,965 ft.
Burton-Sutton Oil Co. No. 24 School Ld., sec. 16-14s-13w. Drlg.
Burton-Sutton Oil Co. No. 25 School Ld., sec. 16-14s-13w. Drlg.
Magnolia Pet. Co. No. 22 Cameron Meadows, sec. 21-14s-13w. Cg. sd. and shells.

Cheneyville—Rapides Parish

Amerada Pet. Corp. No. 4 Weil, sec. 53-1s-2e. 9⅝-in. csg. 6,471 ft.; T.D. 7,045 ft.; salt; P.B. 6,718 ft.; perf. csg. 6,695-6,710 ft.; tstd. S.W.; P.B.; perf. csg. 5,728-32 ft.; tstd. 550 lbs. press.; 2 jts. oil and gas-cut mud.
Texas Co. No. 3 Weil Ld. Co., sec. 53-1s-2e. Drlg. sh. 1,030 ft.

Charenton—St. Mary Parish

Pan American Prod. Co. No. 2-A Encer sec. 11-13s-9e. T.D. 1,905 ft.; I.P. 56 B.P.D.; pmpg.
Pan American Prod. Co. No. 3 South Coast Corp., sec. 30-18s-10e. T.D. 7,833 ft.; P.B. 7,228 ft.; sdtrkd.; drlg. sdy. sh. 7,928 ft.
Pan American Prod. Co. No. 1 H. L. Laws Realty Co., sec. 2-13s-9e. Drlg. sh. 960 ft.
Pan American Prod. Co. No. 7 Laws Realty Co., sec. 25-13s-9e. Drlg. sd.& sh. 960 ft.

Choctaw—Iberville Parish

La. Crusader Oil Co. No. 2 Schwing, sec. 29-8s-11e. Drlg. sh. 2,365 ft.
Standard Oil Co. No. 8 Gay, sec. 52-9s-1?e. T.D. 6,801 ft.; P.B. 3,200 ft.; drlg. sh. 3,398 ft.

Darrow—Ascension Parish

Darrow Oil Co. No. 1 Dennis, sec. 68-10s-2e. T.D. 2,150 ft.; no report.
Humble O. & R. Co. No. 17 Community, sec. 33-10s-2e. T.D. 6,584 ft.; W.O. csg.
Humble O. & R. Co. No. 18 Community, sec. 30-10s-2e. R.U.
Kiva Oil Co. No. 1 Duplessis, sec. 69-10s-2w. S.D. 2,523 ft.

Dog Lake—Terrebonne Parish

Texas Co. No. 21 State, sec. 5-22s-16e. T.D. 7,174 ft.; P.B. 5,490 ft.; sdtrkd.; drlg. sd.&sh. 5,967 ft.; (corrected).

Fausse Point—Iberia Parish

Texas Co. No. 4 State, sec. 35-11s-8e. 18⅝-in. csg. 90 ft.; top sd. 7,912 ft.; top salt 6,595 ft.; drlg. sh. 9,246 ft.

Four Isle—Terrebonne Parish

Texas Co. No. 9 L.L.&E., sec. 24-21s-16e. T.D. 8,553 ft.; P.B. 3,881 ft.; sdtrk.; T.D. 6,943 ft.; 9⅝-in. csg. 6,870 ft.; T.D. 10,725 ft.; abd.

Garden Island—Plaquemines Parish

Texas Co. No. 18 State, sec. 37-23s-33e. T.D. 5,064 ft.; P.B. and sdtrkd.; T.D. 4,912 ft.; 5-in. csg. 4,912 ft.; perf. csg. 4,826-74 ft.; I.P. 957 bbls. P.L.O. per day; ¾-in. ck.
Texas Co. No. 27 State, sec. 38-23s-33e. Drlg. sh. 1,184 ft.

Hackberry—Cameron Parish

W. T. Burton No. 3 Lewis, sec. 22-12s-10w. R.U.
Stanolind O. & G. Co. No. 8 Carter & Sweeney, sec. 22-12s-10w. R.U.
Stanolind O. & G. Co. No. 10 Carter & Sweeney, sec. 22-12s-10w. R.U.; (cor.).
Stanolind O. & G. Co. No. 54 State-Kelso, sec. 16-12s-10w. T.D. 5,825 ft.; P.B. 4,000 ft.; drlg. sh. 5,080 ft.
Stanolind O. & G. Co. No. 55 State-Kelso Bayou, sec. 16-12s-10w. R.U.R.
Superior Oil Co. No. 1 Benson-Vincent, sec. 30-12s-10w. T.D. 6,287 ft.
Texas Co. No. 24-B State, sec. 12s-9w. Drlg. sh. 7,951 ft.
Union Sulphur Co. No. 1 Doiron, sec. 37-12s-10w. T.D. 4,888 ft.; 7-in. csg. 4,876 ft.; heaving sh. 5,940 ft.; P.B. 3,572 ft.; sdtrkg. at 3,531 ft.; drlg. sh. 4,-854 ft.
York Oil Field Supply No. 3 Vincent, sec. 28-12s-10w. T.D. 2,947 ft.; P.B. 2,895 ft.; P.B. 2,848 ft.; to sdtrk.; T.D. 3,285 ft.; P.B. to 2,800 ft.; R.U. to pmp.

Horseshoe Bayou—St. Mary Parish

Texas Co. No. 1 St. Mary Parish Ld. Co., sec. 37-17s-9e. 13⅜-in. csg. 1,837 ft.; cg. sh.&L. 10,752 ft.; cd. sd.; oil odor 10,655-95 ft.; T.D. 11,022 ft.; S.W. sd.; rmg.

Jeanerette—St. Mary Parish

Herton Oil Co. No. 2 Carter, sec. 38-13s-9e. T.D. 9,939 ft.; 7-in. csg. 9,937 ft.; T.D. 10,476 ft.; well tried to blow out; P.B. and sdtrkd.; drld. to 10,482 ft.; rng. Schlumberger survey.
Herton Oil Co. No. 1-A Roane Sugar Co., sec. 38-13s-9e. Drlg. sd. 3,599 ft.

Jennings—Acadia Parish

F. W. Bennett No. 2 Brethern, sec. 41-9s-2w. Drlg. sh. 1,590 ft.
H. Fotiades No. 2 Washington Opelousas, sec. 41-9s-2w. 16-in. csg. 106 ft.; drlg. sh. 5,187 ft.
Fred I. Getty No. 1 Lyons Oil Corp., sec. 46-9s-2w. Drlg. gbo. 30 ft.
Gulf Ref. Co. No. 39 Arnaudit, sec. 47-9s-2w. T.D. 4,840 ft.; P.B. 2,585 ft.; T.D. 4,586 ft.; 9⅝-in. csg. 4,578 ft.; drlg. sd. 6,298 ft.
Jolly Pet. Co. No. 2 McFarlain, sec. 41-9s-2w. T.D. 7,180 ft.; rng. csg.
L. & L. Oil Co. No. 1 Syndicate Clement, sec. 46-9s-2w. Drlg. gbo. 1,169 ft.
Pet. Heat & Power Co. No. 1 Iowa-Jennings, sec. 45-9s-2w. Drlg. sh. 1,112 ft.
Stanolind O. & G. Co. No. 19 Houssiere-Latreille, sec. 47-9s-2w. T.D. 6,448 ft.; P.B. 6,135 ft. to strtn. hole; T.D. 6,979 ft.; P.B. 6,700 ft.; P.B. and sdtrkg. 7,-509 ft.; drlg. sh. 7,219 ft.
Superior Oil Co. No. 2 Julis Clement, sec. 46-9s-2w. Drlg. sh.&L. 5,667 ft.
Superior Oil Co. No. 6 Jennings-Heywood, sec. 41-9s-2w. T.D. 6,056 ft.; fsg. P.B. and sdtrkd.; T.D. 6,472 ft.; rng. csg.
Superior Oil Co. No. 9 Leckelt, sec. 42-9s-2w. T.D. 7,281 ft.; fsg.
Superior Oil Co. No. 10 Leckelt, sec. 43-9s-2w. R.U.
Superior Oil Co. No. 11 Leckelt, sec. 42-9s-2w. T.D. 6,735 ft.; 7-in. csg. 6,670 ft.; I.P. 375 bbls. in 21 hrs. through various chokes.
Superior Oil Co. No. 12 Leckelt, sec. 42-9s-2w. Drlg. sh.&sd. 6,054 ft.
Superior Oil Co. No. 13 Leckelt, sec. 42-9s-2w. R.U.
Victor Weisse No. 1 Clement, sec. 46-9s-2w. Drlg. sh. 3,040 ft. in sdtrkd. hole.

Lafitte—Jefferson Parish

Texas Co. No. 10 Lafitte, sec. 17-17s-24e. Drlg. sh.&L. 7,108 ft.
Texas Co. No. 1-B Madison, sec. 19-17s-24e. Drlg. sdy. sh. 3,701 ft.
Texas Co. No. 3 Marrero Ld. Co., sec. 29-17s-24e. R.U.
Texas Co. No. 9 Rigolet-Cooperation Fur Co., sec. 29-17s-24e. Drlg. sh. 9,710 ft.

Lake Long—Lafourche Parish

Fohs Oil Co. No. 4 State, sec. 64-17s-19e. 10¾-in. csg. 2,707 ft.; drlg. sh. 8,716 ft.

Lake Pelto—Terrebonne Parish

Texas Co. No. 19 State-Lake, sec. 17-23s-18e. T.D. 5,703 ft.; sdtrkd.; drlg. sd. 6,603 ft.

Leesville—Lafourche Parish

Texas Co. No. 68 L.L.&E., sec. 27-21s-22e. Drlg. sh.&L. 5,139 ft.

Lirette—Terrebonne Parish

Humble O. & R. Co. No. 1 Wurzlow, sec. 32-19s-19e. T.D. 7,272 ft.; pulled in drk. fsg.
Union Prod. Co. No. 1 Fundenburk, Unit 1, sec. 50-19s-19e. Drlg. sdy. sh. 6,212 ft.

New Iberia—Iberia Parish

Wm. Helis No. 5 Bolivar, sec. 56-12s-7e. T.D. 4,337 ft.; salt; P.B. and sdtrkd.; T.D. 3,594 ft.; 7-in. csg. 3,100 ft.; reset screen; tstg.
Wm. Helis No. 4 Schwing, sec. 56-12s-7e. T.D. 4,216 ft.; P.B.; sdtrkd.; drlg. sd. 3,387 ft.
Texas Co. No. 4 Bryant, sec. 25-12s-7e. R.U.R.
Texas Co. No. 5 Duhe, sec. 26-12s-7e. Drlg. L. 4,608 ft.
Texas Co. No. 11-B Hanzen, sec. 54-12s-7e. Drlg. sdy. sh. 3,083 ft.

North Crowley—Acadia Parish

Humble O. & R. Co. No. 2 Habetz, sec. 45-8s-1e. Drk.
Humble O. & R. Co. No. 1 Smith, sec. 44-8s-1e. T.D. 8,293 ft.; 7-in. csg. 8,287 ft.; perf. csg. 8,280-85 ft.; swbd. S.W.
Humble O. & R. Co. No. 1 Traham, sec. 3-9s-1e. T.D. 9,780 ft.; rmg.

Port Barre—St. Landry Parish

Pan American Prod. Co. No. 5 Cormier, sec. 4-6s-5e. R.U.
Texas Co. No. 22 Botney Bay Lbr. Co., sec. 4-6s-5e. T.D. 3,569 ft.; P.B. 3,405 ft.

Quarantine Bay—Plaquemines Parish

Gulf Ref. Co. No. 4 State, sec. 17-19s-17e. T.D. 5,700 ft.; 9⅝-in. csg. 5,560 ft. cd. sd., oil odor 7,853-8,227 ft.; cg. sd. 8,320 ft.

Raceland—Lafourche Parish

Amerada Pet. Corp. No. 2 South Coast Corp., sec. 34-15s-19e. R.U.

Roanoke—Jeff Davis Parish

Humble O. & R. Co. No. 1 Williams, sec. 13-9s-4w. Drlg. sh. 4,500 ft.

Sorrento—Ascension Parish

Pan American Prod. Co. No. 9 United Ld. Co., sec. 15-10s-4e. T.D. 1,333 ft. I.P. 16 B.P.H.; ¾-in. ck.; csg. started to leak; killed to recmt. csg.

South Elton—Jeff Davis Parish

Stanolind O. & G. Co.-Amerada Pet. Corp. No. 3-B Calcasieu Natl. Bank, sec. 27-7s-3w. T.D. 9,154 ft.; conditioning hole 9⅝-in. csg. 8,647 ft.; T.D. 13,210 ft.; D.S. stk.; P.B.

Starks—Calcasieu Parish

Capital Oil Co. No. 1 Lutcher-Moore, sec. 24-9s-13w. R.U.

Sulphur—Calcasieu Parish

Union Sulphur Co. No. 860 fee, 1,250 ft. W and 216 ft. N of C sec. 29-9s-10w. R.U.
Union Sulphur Co. No. 861 fee, sec. 29-9s-10w. Drk.

Timbalier Bay—Lafourche Parish

Gulf Oil Corp. No. 4 State, sec. 36-23-21e. R.U.

Valentine—Lafourche Parish

Wm. Helis No. 1 Valentine-Sugars, Inc sec. 2-17s-20e. T.D. 7,134 ft.; P.B. and sdtrkd.; top sd. 6,912 ft.; well tried to blow out.
Pan American Prod. Co. No. 1-B Community, sec. 58-17s-20e. T.D. 8,160 ft.; 7-in. csg. 7,790 ft.; abd.
Pan American Prod. Co. No. 16 Harang, sec. 7-17s-20e. T.D. 7,236 ft.; P.B. and sdtrkd.; T.D. 6,789 ft.; 7-in. csg. 5,-710 ft.
Pan American Prod. Co. No. 17 Harang, sec. 9-17s-20e. T.D. 7,496 ft.; P.B. and sdtrkd.; drlg. sh.&L. 5,965 ft.

Venice—Plaquemines Parish

Tide Water Oil Co. No. 5 Manhattan Fruit Co., sec. 26-26s-30e. Top oil sd. 7,250 ft.; T.D. 7,300 ft.; P.B. 4,800 ft.; sdtrkd. at 4,813 ft.; cd. oil sd. 7,101-68 ft.; T.D. 7,290 ft.; 7-in. csg. 7,191 ft. perf. csg. 7,100-24 ft.; tstd. gas; perfg. 5,917-34 ft.; tstg.
Tide Water Asso. Oil Co. No. 6 Manhattan Ld. & Fruit Co., sec. 26-21s-30e. Cd. sd. S.O. 5,950-65 ft.; cd. oil sd. 7,127-59 ft.; T.D. 7,202 ft.; 7-in csg. 7,200 ft.; perf. csg. 7,127-56 ft.; I.P. 509 B.P.D.; ¼-in. ck.
Tide Water Oil Co. No. 7 Manhattan Ld. & Fruit Co., sec. 26-21s-30e. R.U.

Vinton—Calcasieu Parish

M. McLean No. 17 Gray, sec. 35-10s-12w. R.U.

Villa Platte—Evangeline Parish

Continental Oil Co. No. 1 McDaniel, sec. 44-3s-2e. T.D. 9,030 ft.; 7-in. csg. 9,030 ft.; I.P. 178 bbls. P.L.O. in 3 hrs.; ¾-ck.
Continental Oil Co. No. 1 Opelousas, St Landry Securities Co., sec. 44-3s-2e Drlg. sh. 5,600 ft.
Continental Oil Co. No. 1 Tate, sec. 44-3s-2e. T.D. 9,062 ft.; P.B. 8,982 ft.; I.P. 263 B.P.D.; ¾-in. ck.
Continental Oil Co. No. 1 T. E. Vidrine, sec. 47-3s-2e. Drlg. sh.&L. 8,497 ft.

Welsh—Jeff Davis Parish

J. Massart No. 1 L. T. Mathews, sec. 27-9s-5w. T.D. 1,714 ft.
Stanolind O. & G. Co. No. 2 Conover, sec. 20-9s-5w. M.I.M.

Woodlawn—Jeff Davis County

Union Sulphur Co. No. 2 Calcasieu Natl Bnk., sec. 12-9s-6w. Drlg. sh. 8,779 ft.

S. LOUISIANA WILDCATS

Acadia Parish

H. E. Dalton No. 1 Setting, sec. 17-7s-1w. T.D. 5,106 ft.; P.B. to approx. 500 ft.; T.D. 3,925 ft.; D.S. stuck.
Humble O. & R. Co. No. 1 Finch, sec. 22-10s-1e. 9⅝-in. csg. 7,474 ft.; drlg. sh. 9,873 ft.

Avoyelles Parish

G. C. Koch et al No. 1 Kelone, sec. 21-2n-3e. 10¾-in. csg. 987 ft.; drlg. sh. 4,950 ft.

Beauregard Parish

Republic Prod. Co. No. 1 Lutcher-Moore Lbr. Co., sec. 10-13w-4s. 10¾-in. csg. 1,015 ft.; drlg. sh. 7,380 ft.; corrected.

Calcasieu Parish

Sun Oil Co. No. 1 Lutcher-Moore Lbr. Co., sec. 1-8s-13w. Drlg. sdy. sh. 6,-190 ft.
Wheeler Oil Corp. No. 2 Sch. Ld., sec. 1-9s-7w. 15½-in. csg. 46 ft.; S.D. 641 ft.

Cameron Parish

Humble O. & R. Co. No. 1-B Miami Corp., sec. 7-14s-6w. 13⅜-in. csg. 2,-150 ft.; T.D. 9,270 ft.; P.B. 8,292 ft.; to sdtrk.
Superior Oil Co. No. 1 Sells, sec. 5-15s-8w. R.U.

Iberia Parish

Texas Co. No. 1 Bayless-Jones, sec. 58-12s-5e. Drlg. sdy. L. and anhy. 6,851 ft.
Texas Co. No. 2-B Vermilion Bay, sec. 20-16s-5e. T.D. 9,101 ft.; P.B. and sdtrkd. at 5,788 ft.; T.D. 7,020 ft.; P.B. 6,385 ft.; to sdtrk.; T.D. 7,623 ft.; P.B. 7,-176 ft.; to sdtrk.; T.D. 7,348 ft.; 9⅝-in. csg. 7,263 ft.; drlg. sh. 7,834 ft.

Jefferson Parish

Julius Szodomka No. 1 Carroll, sec. 12-12s-11e. Drlg. sh. 3,015 ft.

Lafayette Parish

Continental Oil Co. No. 1 Foreman, sec. 36-9s-3e. Drlg. sh. 9,580 ft.

Pointe Coupe Parish

Batchelor Oil Co. No. 1 Hackney, sec. 28-3s-8e. 20-in. csg. 117 ft.; 13⅜-in. csg. 2,170 ft.; drlg. sh. 7,210 ft.

Rapides Parish

J. J. Farrell No. 1 W. P. Aertker, sec. 16-4n-1e. Drk.

St. Bernard Parish

Gulf Ref. Co. No. 3 State Lake, Twp. 12s-15e. 13⅜-in. csg. 1,558 ft.; drlg. sh. 1,600 ft.

St. James Parish

Continental Oil Co. No. 1 Realty Operators, sec. 17-12s-17e. Drlg. sd. and grav. 888 ft.

St. Landry Parish

Nixon & Toombs No. 1 Boagni, sec. 41-6s-4e. T.D. 6,740 ft.
Western Gulf Pet. Co. No. 1 St. Mary Ld. Co., sec. 7-8s-9e. Loc.

St. Martin Parish

Shell Pet. Corp. No. 1 Unit, sec. 11-14s-12e. T.D. 10,000 ft.; abd.
Texas Co. No. 11 St. Martin Ld. Co., sec. 21-8s-7e. Bldg. drk.

St. Mary Parish

Pet. Heat & Power Co. No. 9, sec. 9-13s-9e. Abd. 3,009 ft.

St. Tammany Parish

Ozro B. Phillips No. 2 W. L. Stevenson, sec. 33-6s-10e. Drlg. sdy. sh. 827 ft.

New MAC
PLUNGER BARREL
for 2-inch tubing

Outlasts three ordinary barrels, as Steel Plunger works in and out of Cast Iron Barrel as much as 2 feet on the up and down stroke and more if desired, thus flushing itself free of sand or gypsum.

Reversible Valve Body and Plunger make for lowest upkeep.

Furnished with 2-Cup Standing Valve and with, or without, Garbutt Rod.

Save, with the New "MAC"!

Ask for complete details and price list.

McGREGOR
WORKING BARREL COMPANY
Bradford, Pa., U.S.A.

Terrebonne Parish

Fohs Oil Co. No. 1 Buckley & Bourg, sec. 77-19s-17e. Drlg. sh. 10,315 ft.
Fohs Oil Co. No. 1 State, sec. 41-19s-19e. 18⅝-in. csg. 246 ft.; cd. sd. S.G. 6,894-6,915 ft.; T.D. 9,242 ft.; drld. plug.

Vermilion Parish

Magnolia Pet. Co. No. 1 J. B. Ferguson, sec. 5-12s-2w. 13⅜-in. csg. 3,084 ft.; drlg. ahead.

ARKANSAS

Bradley County

Phillips Pet. Co. No. 1 Marsden, sec. 9-16w-11s. Drlg. 207 ft.

Cleveland County

J. T. Markwick and E. O. Olds No. 1 A. Vance, NW cor. NW sec. 18-11-11. D.&A. 3,561 ft.

Columbia County

Kerr-Lynn Oil Co. No. 1 Barnett, sec. 14-17-20. Packer set at 7,630 ft.; D.S.T. 7,630-7,740 ft.; ⅝-in. bttm. ck. and 1½-in. top ck.; flwd. 21 B.P.H.; no press. ga.; grav. oil 37.9 cor.; comp.; 284 bbls. in 20 hrs. on ¼-in. ck.; gas-oil ratio 292 to 1; T.D. 7,740 ft.
Standard Oil Co. of La. No. 1 S. T. Crone, NW cor. NW SE sec. 8-16-22. Top L. 7,264 ft.; porous and sat. to 7,272 ft.; T.D.; D.S.T. 7,225-72 ft.; rec. 600 ft. oil and 60 ft. oil and mud in 20 min.; stk. 7-in. csg. 6,970 ft.; tstd. csg. and perf.; set 7-in. at 7,260 ft.; wshd. with oil; comp.; 58 B.P.H.; ½-in. ck.; acdzd. with 5,000 gal.
Standard Oil Co. of La. No. 2 Crone, NW cor. SE SW sec. 8-16-22. R.U.
Standard Oil Co. of La. No. 1 W. P. Phillips et al, 660 ft. N and W. C sec. 15-17-19. Cd. sh. strks. sd. 6,053 ft.
Standard Oil Co. of La. No. 1 Waters et al, 660 ft. SE cor. SE SE sec. 7-16-22. Set 9⅝-in. csg.; W.O.C.; T.D. 2,036 ft.

Desha County

Columbian Fuel Corp. No. 1 Cross, SW cor. sec. 34-8s-3w. Drlg. sdy. sh. 3,280 ft.

Hempstead County

H. D. Easton et al No. 1 LaGrone, sec. 5-12-26. T.D. 2,940 ft.; P.B. 1,007 ft.; drlg. sticky sh. 2,680 ft.

Little River County

Joe G. Strahan et al No. 2 Dierks Lbr. Co. S.D. 2,459 ft.

Miller County—Rodessa

F. W. Burford No. 2 Ahern, sec. 10-20-28. Cg. 3,955 ft.
Burden & Cummings No. 1 Treadway, sec. 10-20-28. Comp.; 33 B.P.H.; ⅛-in. ck.; T.D. 6,137 ft.; set 5½-in. csg. 6,134 ft.
Gerhig Co. of Ark. No. 1-B Mitchell, sec. 11-20-28. Drlg. L.&sh. 5,756 ft.
Lacey & Riley No. 1 Mitchell, SW cor. NW NW sec. 11-20-28. R.U.
W. M. Layton No. 2 McKellar, sec. 15-20-28. Drlg. sh.&L. 5,214 ft.
McClanahan & Feazel No. 2 Eason, C N½ NW SW sec. 12-20-28. Set 7-in. csg. 6,060 ft.; tstd. some oil 6,112 ft.; acd. with 3,000 gal.; tstd. small S.O.& G.; pid. tbg. to swb. csg.; T.D. 6,112 ft.; 2,000 ft. O.I.H.; will set tbg.
B. B. Orr No. 1 Mitchell, sec. 10-20-28. Set 7-in. csg. 6,152 ft.; perf. 6,128-48 ft.; comp.; 50 B.P.H.; ½-in. ck.
Roberts Drlg. Co. No. 2-B Capps, sec. 10-20-28. Drlg. sh. 3,476 ft.
Texas Canadian Oil Corp. No. 2 Thomas, NE cor. NW SE sec. 12-20-28. T.D. 6,203 ft.; perf. 7-in. csg. 6,108-78 ft.; tstd. S.W.; arng. P.B. 6,160 ft.; tstd. S.W.; set pkrs. 6,140 ft.; tstd. S.W.; cmtd. and reperf. 6,108-32 ft.; acdzd.; swbg. 20 B.P.D.; no S.W.
Mrs. S. O. Thompson No. 1 Concord Methodist Church, NE cor. SE NE sec. 10-20-28. Set 7-in. csg. 6,130 ft.; perf. 6,120-30 ft.; comp.; 47 B.P.H. on 10/64-in. ck.; T.D. 6,147 ft.
Mrs. S. O. Thompson No. 2 Greer, sec. 11-20-28. Drlg. anhy.&sh. 5,749 ft.

Nevada County

Bruce E. Wallace No. 2 Haynie, SE cor. SE NE sec. 5-14-21 T.D. 1,060 ft.; gmy. sh.; wshg. to bttm.

Ouachita County

A. H. Tarver et al No. 1 Guy Smith, sec. 16-14-19. Tokio sd. 2,186-2,210 ft.; T.D. 2,331 ft.; D.&A.

Pulaski County

A. L. Kitselman, No. 2 A. L. Kitselman Jr., SE SE SW sec. 2-1s-13e. Drlg. v. hd. bl. slate 2,640 ft.

Union County—Shuler

Alice Sydney Oil Co. No. 1 Powledge SE cor. SW SE sec. O.W.W.O.; ran Schlumberger; set 7-in. at 7,721 ft.; T.D. 7,729 ft.; comp.; 1,576 bbls. in 23 hrs.; perf. csg. 7,600-30 ft.
Alice Sydney Oil Co. No. 2 Powledge, sec. 7-18-17. Rng. 10¾-in. csg. 1,650 ft.
Alice Sydney Oil Co. No. 3 Powledge, SW cor. SE SE sec. 7-18-17. R.U.
E. M. Jones No. 3 Marine Oil Co., NE NW SE sec. 17-18-17. Set 16-in. csg. 138 ft.; drlg. rd. and gry. sh. 5,911 ft.
E. M. Jones et al No. 2-A Murphy, sec. 19-18-17. Drlg. rd. and gry. sh. 4,275 ft.
Lion Oil Ref. Co. No. 3 Marine Oil Co. sec. 17-18-17. Drlg. rd. and gry. sh. 3,990 ft.
Lion Oil Ref. Co. No. 1 Mayfield, SE cor. Lot 3, Fract. NW¼ sec. 18-18-17 Drlg. sdy. sh. 6,995 ft.
Lion Oil Ref. Co. No. 1 Miller, SW cor NE NW sec. 18-18-17. T.D. 7,710 ft.; set 7-in. at 7,708 ft.; comp.; 1,069 B. P.D.; ⅝-in. ck.
Lion Oil Ref. Co. No. 1 Edna Morgan, NE cor. Lot 5, NW sec. 18-18-17. Drlg. 170 ft.
Lion Oil Ref. Co. No. 4-A Edna Morgan, NW cor. Lot 1, SW sec. 18-18-17. Top Jones sd. 7,504 ft.; top L. 7,602 ft.; set 5½-in. csg. 7,613 ft.; T.D. 7,620 ft.
Lion Oil Ref. Co. No. 5-A E. Morgan, NE cor. Lot 7, SW sec. 18-18-17. Drlg rd. and gr. sh. 7,463 ft.
Lion Oil Ref. Co. No. 2-C D. S. and J. C. Morgan, SW cor. SE SE sec. 18-18-17. Drlg. 7,623 ft.
Marine Oil Co. No. 5 fee, sec. 17-18-17. Set 10¾-in. csg. 1,743 ft.
Marine Oil Co. No. 6 fee, sec. 17-18-17. Drlg. 725 ft.
Marine Oil Co. No. 1 Miller, SE cor. Lot 1, NW sec. 18-18-17. Top Jones sd. 7,543 ft.; top L. 7,655 ft.; set 7-in. csg. 7,709 ft.; T.D. 7,729 ft.
Phillips Pet. Co. No. 3 Justiss, Lot 6, sec. 18-18-17. Drlg. rd. and gry. sh. 3,786 ft.
Phillips Pet. Co. No. 4 Justiss, Lot 6, sec. 18-18-17. Set 10¾-in. csg. 2,266 ft.; drlg. rd. sdy. sh. 6,865 ft.
Phillips Pet. Co. No. 2 Marine, NE cor NW NE sec. 20-18-17. Drlg. hd. rd. sh. 6,430 ft.
Phillips Pet. Co. No. 3 Marine Oil Co., sec. 20-18-17. Drlg. 2,510 ft.
Phillips Pet. Co. No. 4 Marine Oil Co., sec. 20-18-17. Drlg. 1,919 ft.
Phillips Pet. Co. No. 5 Marine Oil Co., sec. 20-18-12. Drlg. 225 ft.
Phillips Pet. Co. No. 3 Marks, C Lot 2, SW sec. 18-18-17. Drlg.
Texas Canadian Oil Corp. No. 1 Powledge, C NE NW NW sec. 21-18-17 Drlg. hd. rd. sh. 6,959 ft.

Union County—Other

Ark. Southern Oil Corp. No. 2-A Simmons, SW cor. NE NW sec. 15-18-13. T.D. 2,307 ft.; O.I.H.; pmpg.; no ga.
Ark. Southern Oil Corp. No. 3-A Simmons, sec. 15-18-13. R.U.
E. G. Bradham No. 1 S. L. Robbins, SW cor. SW NE sec. 12-19-16. S.D. sdy. sh 2,300 ft.
Penn-Ark. Pet. Corp. No. 1 Raulston, sec. 12-17-14. T.D. 3,175 ft.; D.&A.
W. D. Wingfield, Tr. No. 2 Kidd Est., SE cor. NW SW sec. 15-18-13. Sd. S.D. 2,257-2,300 ft.; set 6-in. csg. 2,250 ft.; T.D. 2,300 ft.; W.O.S.R.
W. D. Wingfield, Tr., No. 1 Union Sawmill Co., sec. 15-18-13. S.D. 432 ft.

LEGAL

United States Department of the Interior, General Land Office, Washington, D. C. Notice is hereby given that the following lands and oil and gas deposits adjacent to or within the known geological structure of the West Red River and Middle Red River oil and gas fields, Tillman County, Oklahoma, are offered to the responsible qualified bidder of the highest bonus pursuant to Section 5 of the act of March 4, 1923 (42 Stat. 1448), and Section 17 of the act of February 25, 1920 (41 Stat. 437), as amended by the act of August 21, 1935 (49 Stat. 674), at the royalty rate scale in the lease form shown in General Land Office Circular No. 1386: Unit No. 1, containing approximately 17 acres; Unit No. 2, containing approximately 24 acres; Unit No. 3, containing approximately 64 acres; and Unit No. 4, containing approximately 150 acres. Bids will be received on the separate units but two or more units awarded to the same purchaser may be included in a single lease. Specifications showing the location and description of the units may be obtained from the General Land Office, Washington, D. C., or the United States Geological Survey, Wichita Falls, Texas. The sale will be held in the office of the Petroleum Engineer, Geological Survey, Federal Building, Wichita Falls, Texas, at 12:00 noon on May 9, 1938. The successful bidder must deposit on the day of the sale a certified check on a solvent bank, or cash, for 1/5 of the amount of each bid, and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remaining 4/5, together with the annual rental in advance, at the rate of $1 per acre, must be paid prior to the issuance of the lease. The bidders are warned against violations of the provisions of section 59 of the U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. The remaining lands and deposits in the bed of Red River extending from the north fork of the river to the 98th Meridian, west longitude, are subject to disposition in accordance with the Order of the Secretary of the Interior fixing April 1, 1938, as the opening date. Commissioner.

TEXAS

Week Ending April 9

GULF COAST FIELDS

Lockridge—Brazoria County

Gulf Oil Corp. No. 5 Carrie Baker, J. W. Hall Sur. No. 11. Drk.
Gulf Oil Corp. No. 4 Gibson, J. W. Hall Sur. R.U.

Hastings Field—Brazoria County

Humble O. & R. Co. No. 1 P. O. Day and W. G. McDeed, H.T.&B. Sur. 37. R.U.
Producers Inv. Co. No. 5 C. H. Alexander, A.C.H.&B. Sur. No. 1. R.U.
Jay Simmon No. 5 C. H. Alexander, H. T.&B. Sur. 27. T.D. 1,213 ft.; W.O.C.
Stanolind O. & G. Co. No. 20 Drake, H. T.&B. Sur. No. 36. T.D. 5,485 ft.; tstg.
Stanolind O. & G. Co. No. 1 R. M. Froberg, R. A. Magee Sur. T.D. 1,235 ft.; W.O.C.
Stanolind O. & G. Co. No. 8 Guido, H.T. &B. Sur. No. 36. T.D. 6,080 ft.; perf. csg. 6,020-60 ft.; comp.; no ga.
Stanolind O. & G. Co. No. 1 R. J. Schmidt, H. Stevens Sur. T.D. 6,080 ft.; 7-in. csg. 6,080 ft.

Old Ocean—Brazoria County

Harrison-Abercrombie No. 1 L. Augusburger, C. Breen Sur. R.U.
Harrison-Abercrombie No. 1 David Kaufman, C. Breen Sur. R.U.
Harrison & Abercrombie Oil Co. No. 1 Troyer and West Texas Abst. Co., C. Breen Sur. Drlg. sh. 9,496 ft.

West Columbia—Brazoria County

Frost and Dunnan No. 1 E. S. Parker, Geo. Tennille Sur. Bldg. drk.
Mike Hogg No. 2 Varner, W. Varner Lge. Drlg. sh.&L. 3,615 ft.
Sterling O. & R. Co. No. 2 Munson, Geo. Tennille Sur. Loc.
Texas Co. No. 20-A Abrams, George Tennille Sur. Drlg. sh.&L. 5,505 ft.
Texas Co. No. 21 Abrams, Geo. Tennille Sur. Drlg. sh. 4,227 ft.
Texas Co. No. 22 Abrams, G. Tennille Sur. T.D. 1,131 ft.; W.O.C.
Texas Co. No. 7 J. G. Phillips, George Tennille Sur. Drlg. sh. 6,249 ft.
Texas Co. No. 4 T. L. Smith, Geo. Tennille Sur. T.D. 6,607 ft.; P.B. 5,600 ft.; W.O.C.
Wallace Oil Co. and others No. 1 Hargrove, G. Tennille Sur. Drlg. sh. 4,620 ft.; no report.

Sandy Point—Brazoria County

J. A. Fite No. 1 fee, Blk. 45, D. Talley Sur. Drlg. sh. 5,026 ft.

Calhoun—Heyser—Victoria County

Blanco Oil Co. et al No. 9-C Dunwoody, A. Sisneros Sur. T.D. 5,595 ft.; no ga.
Blanco-Buchanan No. 10 Dunwoody, A. Sisneros Sur. Drk.
Geo. Echols No. 9 Bennett, J. E. Galban Sur. R.U.
Geo. Echols No. 12 W. H. Bennett, J. Galban Sur. Drk.
George Echols No. 5 O. M. Lander, J. E. Galban Sur. T.D. 5,748 ft.; tstg.
Gulf Oil Corp. No. 4-B C. P. Traylor, J. Galban Sur. Drk.
Gulf Ref. Co. No. 3 L. P. Schultz, J. E. Galban Sur. R.U.
Magnolia Pet. Co. No. 7 Lander, J. E. Galban Sur. Drlg. sdy. sh. 5,725 ft.
Normandie Oil Co. No. 6 Cook, A. Sisneros Sur. Drlg. 5,612 ft.
Seaport Oil Corp. No. 1 Mae Diener. R.U.
Sinclair Prairie Oil Co. No. 11 W. H. Bennett, A. Sisneros Sur. Drk.
Sinclair Prairie Oil Co. No. 12 W. H. Bennett, A. Sisneros Sur. T.D. 5,747 ft.; comp.; no ga.

Cedar Bayou—Chambers County

Merit Oil Co. No. 1 Milam, C. Smith Sur. Cg. sh.&sd. 6,319 ft.

Cedar Point Field—Chambers County

Humble O. & R. Co. No. 1 State, sec. 95. Drlg. sh. 4,817 ft.
Standard Oil Co. of Texas and Salt Dome Oil Co. No. 2 State, sec. 119. 16-in. csg. 286 ft.

Seabreeze—Chambers County

Sun Oil Co. No. 1 R. J. Barrow, A. Yarbo Sur. R.U.
Sun Oil Co. No. 2 Sea Breeze Land Co., sec. 102, H.T.&B. Sur. R.U.

Clinton—Harris County

Allamo Drlg. Co.-J. C. Means No. 2 Laura Lackner, H. Reinerman Sur. Drlg. sd. &sh. 1,830 ft.

Eureka—Harris County

Allamo Drlg. Co. No. 2 Laura Lackner, J. Reinerman Sur. Drlg. sh. 924 ft.
Jack Frazier et al No. 1 Varner, Realty Co., J. Reinerman Sur. Drlg. sh. 5,950 ft.
Houston Oil Co. No. 2 Helberg-Lackner, J. Reinerman Sur. Drk.

Fairbanks—Harris County

H. C. Adams No. 1 J. P. Dawson, W. K. Hamblen Sur. T.D. 6,822 ft.; perf. csg. to test.
Amerada Pet. Corp.-Stanolind O. & G. Co. No. 1 L. M. Day, G. Ayers Sur. Drlg. sh. 4,040 ft.
Amerada Pet. Corp.-Stanolind O. & G. Co. No. 1 K. S. Silberg, G. Ayers Sur. 9⅝-in. csg. 1,212 ft.
Mortex Oil Co. No. 1 Johnson, Lawson Sur. R.U.
Mortex Oil Co. No. 1 H. E. Ley, J. Waugh Sur. 16-in. csg. 80 ft.
E. L. Smith and Ownby Drlg. Co. No. 2 L. M. Meyers, J. Ayers Sur. T.D. 6,851 ft.; perf. csg. 6,842-50 ft.; tstg.
H. E. Williams No. 1-A A. Vaga, G. Williams Sur. 10¾-in. csg. 1,168 ft.

Friendswood—Harris County

Humble O. & R. Co. No. 6 Beamer, T. Choate Sur. T.D. 6,045 ft.; W.O.C.
Humble O. & R. Co. No. 7 Beamer, T. Choate Sur. R.U.
Humble O. & R. Co. No. 3 E. A. Grey, Perry & Austin Sur. R.U.
Humble O. & R. Co. No. 5 E. A. Grey, Perry & Austin Sur. 10¾-in. csg. 1,054 ft.; cg. sd. 6,040 ft.
Humble O. & R. Co. No. 2 B. H. Goodwin, W. K. Smith Sur. Loc.
Humble O. & R. Co. No. 1 J. L. Jones, Perry & Austin Sur. Drk.
Humble O. & R. Co. No. 1-B Keisling & Dixon, T. Choate Sur. T.D. 6,043 ft.; W.O.C.
Humble O. & R. Co. No. 2 J. H. Ross, T. Choate Sur. 10¾-in. csg. 1,075 ft.; T.D. 6,046 ft.; W.O.C.
Humble O. & R. Co. No. 1 E. E. Watson. Drk.
Humble O. & R. Co. No. 1-B O. P. Woodburn, A. Whitlock Sur. Drlg. sh. 5,420 ft.

Clam Lake—Jefferson County

Shell Pet. Corp. No. 2 McFaddin, S. A. Pace Sur. Spd.

LaBelle—Jefferson County

Sun Oil Co. No. 3 Broussard-Hebert, B. Blackman Sur. T.D. 8,622 ft.; attempted to blowout; controlled; comp.; flwd. 933 bbls. dist. in 24 hrs. through 3 flow lnrs.

North Cheek—Jefferson County

Magnolia Pet. Co. No. 4 J. H. Phelan, A. Stivers Sur. 18⅝-in. csg. 135 ft.

Hardin—Liberty County

Atlantic Ref. Co. No. 2 W. McMurtry, H. B. Johnson Sur. Cg. sh.&sd. 7,681 ft.
Fohs Oil Co. No. 1 Johnson, H. B. Johnson Sur. Cg. sdy. sh. 7,612 ft.
Jack Frazier No. 2-B Lynott-Buffam, J. Robeson Sur. T.D. 7,660 ft.; tstg.
Gulf Oil Corp. No. 1 A. B. Tullos, H. B. Johnsor Sur. Spd.
Halliburton Oil Prod. Co. No. 2 Hanchy, H. B. Johnson Sur. Drlg. sh. 3,710 ft.
Humble O. & R. Co. No. 1 Partlow, H. B. Johnson Sur. Drlg. sh. 7,486 ft.
Shell Pet. Corp. No. 2 Hanchy, H. B. Johnson Sur. Drlg. sh. 3,139 ft.
Tide Water Associated Oil Co. No. 1 A. Cessena, A. B. Hardin Sur. Drlg. sn. 6,378 ft.
L. W. Wickes No. 3 Tullos, H. B. Johnson Sur. Drlg. sh. 4,212 ft.

Bay City—Matagorda County

Hamman Expln. Co. No. 2 Crooke, E. Hall Sur. Top sd. 9,660 ft.; tstg.; no report.
Hamman Expln. Co. No. 2 G. M. Sloan, J. T. Belknap Sur. Drk.
Pan American Prod. Co. No. 1 Richers, I.&G.N. Sur. X-3. T.D. 9,689 ft.; 7-in. csg. 9,668 ft.; perf. csg. 9,310-20 ft.; tstg.; flwg. 143 B.P.D.; ¼-in. ck.

Palacios—Matagorda County

Sun Oil Co. No. 1 F. K. Robeson, L. Goodwin Sur. Drk.

Orange—Orange County

Gulf Oil Corp. No. 1 O. Duhon, Wm. Dyson Sur. Drlg. sh. 6,800 ft.
Ryan & Thompson No. 1 Walter-McGill, Wm. Dyson Sur. Cg. 5,917 ft.
Shell Pet. Corp. No. 1 E. V. Loeffler, Wm. Dyson Sur. T.D. 5,967 ft.; clg. into pits; no ga.
Union Prod. Co. No. 2 Lutcher-Moore, Dyson Sur. 9⅝-in. csg. 5,162 ft.; cg. sh. 7,287 ft.

Segno—Polk County

Gulf Oil Corp. No. 2 Ragan, I.&G.N. Sur 15. 9⅝-in. csg. 5,587 ft.; 20-min. D.S. T. 8,146-61 ft.; tstd. 2,400 ft. P.L.O.; 140 lbs. press.; drlg. 8,188 ft.
Humble O. & R. Co. No. 8-B Kirby, M. Victor Sur. Drlg. sh. 6,851 ft.

Spurger—Tyler County

Republic Prod. Co.-Houston Oil Co. No. 9 Hurd, N. Hurd Sur. Drlg. sh. 5,884 ft.

GULF COAST WILDCATS

Brazoria County

Pure Oil Co. No. 1 Clemons State Farm, S. F. Austin 7½ Lge. 7⅝-in. csg. 1,955 ft.; T.D. 6,515 ft.; rmg.

Brazos County

Pet. Heat & Power Co. No. 1 Minnie C. Dunn, J. M. Barrera Sur. T.D. 803 ft.

Burleson County

Red Bank Oil Co. No. 1 Coffield, E. Sante Sur. Drlg. sh. 4,349 ft.

Chambers County

Geo. Anderson No. 1 Julia Casey, W. D. Smith Sur. Loc.
A. A. Cameron et al No. 1 White, Sol-

mon Brill Sur. 10¾-in. csg. 1,500 ft.; cg. sh. 8,117 ft.

Fort Bend County

Lomack Oil Co. No. 1 G. W. Armstrong. S. Miller Sur. No. 2. T.D. 6,020 ft.; abd.
Boyle et al No. 1 J. R. Spencer, Thomas Westfall Sur. Drlg. sh. 6,739 ft.

Galveston County

Sun Oil Co. No. 1 Cade, A. Dickinson. 13⅜-in. csg. 2,218 ft.

Harris County

Chapman Mineral No. 1 O. Harris, Wm. Jones Sur. Drlg. sh. 5,797 ft.
J. Frazier No. 1 Robert Gillespie, S. Contreras Sur. R.U.
W. S. Howell No. 1 Root, A. McCormick Sur. S.D. 2,807 ft.
O. W. Killam No. 1 J. J. Sweeney Est. G. Williams Sur. T.D. 6,736 ft.; 5½-in. csg. 6,634 ft.
West Prod. Co. No. 1A fee, Geo. B. McKinstry Sur. R.U.
West Prod. Co. No. 1 G. W. Sowden, J. Lindsey Sur. Cd. oil sd. 5,850-92 ft.: T.D. 6,030 ft.; 7-in. csg. 6,005 ft.; perf. csg. 5,850-70 ft.; tstd. S.W.; no oil; reperfg. csg.

Jasper County

John Mayo No. 1 Cartwright, Legrande Sur. Drk.

Jackson County

Humble O. & R. Co. No. 1 J. R. Davis, I.&G.N. Sur. No. 20, Blk. 150. Drk.
Magnolia Pet. Co. No. 1 West Ranch, Ramon Musquez Sur. Drk.

Jefferson County

I. E. Harwell No. 1 State, Gulf of Mexico T.D. 5,840 ft.; D.S. stk.; pulled in two; S.D.; may abd.
Humble O. & R. Co. No. 1 State, Gulf of Mexico, sec. 8. Drlg. sh. 1,172 ft.

Matagorda County

J. K. Dorrance No. 1 M. Adamcik, I.&G. N. Sur. No. 1. Drlg. sh. 6,164 ft.
Pierce Est. et al No. 1 Paul Kruger. Nel. C. Warren Sur. T.D. 7,383 ft.; P. B.; sdtrkd.; S.D. 6,708 ft.; perf. csg. 6,692-95 ft.; tstd. S.W.; P.B. 6,700 ft.; perf. csg. 6,692-94 ft.; I.P. 15 B.P.D.; ⅛-in. ck.
Sun Oil Co. No. 1 Fred Robbins, C. H. Vandeveer Sur. T.D. 10,160 ft.; well tried to blow out; rmg.

Polk County

C. E. Gates No. 2 I. O. Jackson, J. W. Abbey Sur. Drk.

San Jacinto County

J. W. Oliphant No. 1 Gibbs, Chas. Memim Sur. R.U.

Waller County

D. B. McDaniel No. 1 H. C. Leverkuhn, Lacey Pearsall Sur. R.U.
Stanolind O. & G. Co. No. 1 Freeman, H.&T.C. Sur. No. 99. Drlg. sh. 1,753 ft.

Wharton County

Strake Pet. Corp. et al No. 1 W. N. Poole, H. J. Fry Sur. 10¾-in. csg. 1,484 ft.; T.D. 7,012 ft.; abd.

S. W. TEXAS WILDCATS

Atascosa County

W. M. Allison No. 1 Nieschwietz, J. De La Garza Sur. 216. S.D. 250 ft.
G. D. Curly and R. E. Phalon No. 1 Henritta Kresch, J. C. Dierks Sur. 10-in. csg. 18 ft.
S.W.R. Corp. No. 1 Miller, J. Neill Sur. S.D. 435 ft.

Bastrop County

J. W. Bibb No. 1 Lentz, F. Wilkenson Sur. Top Austin Chalk with odor of oil 2,530 ft.; 5½-in. csg. 2,443 ft.; S.D. 2,550 ft.
R. C. Franklin No. 2 Yarrington, Jose Manuel Bangs Sur. S.D. 110 ft.
Humble O. & R. Co. No. 1 Hellsman, J. Cunningham Sur. 16-in. csg. 150 ft.: 10¾-in. csg. 1,599 ft.; cg. sh. 3,440 ft.
Western Gulf Pet. Co. No. 1 Green, Samuel Williams Sur. No. 4. R.U.

Bee County

Luling O. & G. Co. No. 1 Page. B. Q. Hadley Sur. T.D. 3,930 ft.; abd.

Bexar County

Harrison et al No. 1 Schuwerth, Jose Antonio De La Garza Sur. Drlg. 1,267 ft.
Joe H. Noake No. 1 Oppenheimer. W. Miller Sur. No. 180. 10-in. csg. 17 ft.; S.D. 210 ft.

Caldwell County

Mac-Wag-Tree Oil Co. No. 1 Roberts, W. House Sur. 5½-in. csg. 2,517 ft.; T.D. 2,713 ft.; swbd. well; flwd. sulfur wtr P.B. to test.
Mencill Pet. Co. No. 1 J. Wallinger, Gedeon Pace Sur. S.D. 625 ft.
C. R. Richardson No. 1 Schowe, T. Maxwell Sur., Abst. 188. Drlg. sh. 1,016 ft.

Cameron County

Saxet Prod. Co. No. 1 Port Isabel Irrig. Co. Sur. 30. Drk.

De Witt County

Howeth et al No. 1 H. Fuhrken, J. H. Walton Sur. T.D. 4,506 ft.; abd.

Dimmitt County

Texas & Maryland Corp. No. 1 McKnight, Blk. 13, sec. 23. Base of Austin Chalk 5,201 ft.; top Georgetown L. 6,120 ft.; T.D. 7,116 ft.; 5½-in. csg. 7,094 ft.

Duval County

Corpus Christi Ref. Co. No. 1 Parr, B. S.&F. Sur. 303. Drlg. sh. 3,910 ft.

Frank Gravis No. 1 Megargal, J. Boyles Sur. 10-in. csg. 500 ft.; drlg. plug; no report.
Magnolia Pet. Co. No. 1 Duval Co. Rnch. Co., C.C.S.D.&R.G.N.G. Sur., sec. 87. T.D. 2,529 ft.; abd.
Magnolia Pet. Co. No. 1 W. K. Hoffman, sec. 111, S.A.&M.G. Sur. T.D. 6,666 ft.; abd.
Mills Bennet-Stanolind O. & G. Co. No. 1-A Yates, J. Poitevent Sur. No. 321. 10¾-in. csg. 196 ft.; drlg. sh. 2,603 ft.
Rowan & Hope No. 1 C. K. Gravis, sec. 90. Cg. sh. 4,952 ft.
V. G. Schimmel No. 5 Hagist, sec. 265, B.S.&F. Sur. T.D. 2,196 ft.; 7-in. csg. 2,190 ft.; tstg.
G. Stratton No. 1 Afflerback, H. G. Foster Sur. T.D. 1,097 ft.; 7-in. csg. 1,084 ft.
Sun Oil Co. No. 1 Ross, A.B.&M. Sur. Rig moved from loc.
P. T. Wright No. 1 Hyatt, Sweden Farm Lots Subd. R.U.

Frio County

F. L. Thompson No. 1 Davis, G.B.&C.N. G. Sur. No. 1. Drk.

Goliad County

Windward Oil Co. No. 1 Dreier, B.S.&F. Sur. No. 7. 10-in. csg. 1,000 ft.; T.D. 3,637 ft.; D.S.T. 3,632-37 ft.; blew out while drlg. 5,530 ft.; rng. wild; killed; B.P.; sdtrkd. 1,508 ft.; cg. sh. 3,107 ft.

Guadalupe County

Benstrasser No. 1 Eickenroht, A. Marra Esnaurrezar Sur. R.U.
E. A. Hearn et al No. 1 Dudelof, Jas. L. Clements Sur. S.D. 720 ft.
N. G. Spiller No. 1 Wright Highsmith 5½-in. csg. 2,012 ft.; T.D. 2,290 ft.; corrected; pmpd. 80 bbls. of acid, wtr. and oil in 23 hrs. and pmpd. dry; prep. to reacdz.; pmpd. 69 bbls., in 24 hrs.

Hidalgo County

Gulf States Oil Co. No. 1 Cardenas, Juan Jose Balle Sur. 10¾-in. csg. 1,689 ft.; drlg. sh. 7,614 ft.
Hidalgo Prod. Co. No. 1 Daskam Corp. Porc. 45, Blk. 34. T.D. 2,082 ft.; rmg.

Jim Hogg County

F. S. Adams No. 1 Martinez, sec. 623. T.D. 3,015 ft.; oil sd.; 5⅛-in. csg. 3,005 ft.

Jim Wells County

E. Calloway No. 1 Garcia, R. E. L. King Sur., sec. 54. T.D. 6,530 ft.; 7-in. csg. 6,140 ft.; will test 5,840-48 ft.
Tom Graham Oil Co. No. 1 Martins, La-Vaca Gr. Drlg. 790 ft.
H. H. Howell et al No. 1 Lindsey & Reed, Lavaca Gr. Sur. Drlg. sh. 4,335 ft.
Homer Presnall et al No. 1 Banker Mortgage Co., Jose Maria Garcia Sur. T.D. 3,497 ft.; P.B. 3,496 ft.; 7-in. csg. 3,497 ft.; perf. csg. 3,492-95 ft.; flwg. wash wtr.; no shows oil or S.W.; T.P. 500 lbs.; C.P. 1,075 lbs.
Red Bank Oil Co. No. 1 Robt. Adams, Adams Bros. Sur. Drlg. 2,612 ft.
Southern Minerals Corp. No. 2 Talbert, LaVaca Gr., Jose Maria Garcia Sur. Drk.

Karnes County

Randon Oil Co. No. 1 Karbach, A. M. Tompkins Sur. Drlg. sh. 3,000 ft.

Kleberg County

Pure Oil Co. et al No. 1 State Ld., Tr. 68, Laguna Madre Bay, Lse. No. 529 Dredging canal.

La Salle County

Finley S. Ewing No. 1 Pugh, E. L. Garrett Sur. Spd. and S.D.

Lee County

Eleoussa Oil Co. No. 1 Sanders, J. Vic Roeder Sur. T.D. 4,398 ft.; rmg. to run lnr. and test.

Live Oak County

J. B. Deal et al No. 1 E. B. Herring, Stephen Hays Sur. 10¾-in. csg. 61 ft. T.D. 1,210 ft.; abd.
Louis Franklin No. 1 Russell, John Hefferman Sur. R.U.
Hantho-Nelson No. 1 Geo. West, G. L. Haas Sur. R.U.
Harvey-Henderson No. 3 Nichols, Blk. 27. Drlg. sdy. sh. 1,275 ft.
Karotkin & Richardson No. 1 Pape, Wm. R. Conner Sur. T.D. 3,014 ft.; abd.
Ray L. Martin No. 1 Adams, J. Buchannan Sur. T.D. 965 ft.; (cor.).
J. I. Newton No. 1 George West Est. Airy Pieratt Sur. No. 129. T.D. 2,291 ft.; abd.
J. I. Newton No. 2 Geo. West, James Wright Sur. R.U.
V. G. Schimmel et al No. 1 Geo. West, G. L. Haas Sur. S.D. 210 ft.; prep. to D.D.
Unit Pet. Co. No. 1 Terrell, Mark Kellely Sur., Abst. 20. Cg. 3,315 ft.

McMullen County

Alabama Minerals No. 3 Gordon, A.B.& M. Sur. No. 127. R.U.
Duncan Drlg. Co. No. 1 Martin Henry, sec. 6. S.D. 707 ft.
Hear & Hall No. 1 Byrne, G. Pittich Sur. Cd. sd. show oil and gas 784-90 ft.; T.D. 975 ft.; sd.; rng. csg.

Medina County

F. A. Brown No. 1 Senne, A.C.H.&B. Sur. 105. R.U.
J. W. Cromwell No. 1 J. W. Tondre, I. J. Rogers Sur. Top sd., show oil 520-65 ft.; bailed dry; core ahead.
D. K. J. Oil Co. No. 1 Burrell. T.D. 2,039 ft.; S.D. after swbg. dry.

F. J. Dykstra No. 2 McMenemy, G. Petty Sur. R.U.
Ewing Oil Co. No. 1 Riff, Sur. 42. Cg. Serp.; good show oil; T.D. 716 ft.; 5⅛-in. csg. 542 ft.
Gee Hayes et al No. 1 Conrad, J. Keppler Sur. Drlg. 60 ft.; no report.
Taylor & Pepper No. 1 Saathoff, Peter Eichorn Sur. Drlg. 80 ft.
I. R. Trentman et al No. 1 Carle Merc. Co., V. A. Johnson Sur. T.D. 1,905 ft.; 7-in. csg. 1,835 ft.; prep. acd.
M. L. Walker No. 1 Zuberbulen, A. Bonamy Sur. Spd.

Milam County

Texedo Oil Co. No. 1 Graham, Charles Cornea, Sur. Logged S.O. 1,135-36 ft.; cg. 1,760 ft.
Texedo Oil Co. No. 1 Paul Garves, C. Robertson Sur. S.D. 1,170 ft.

Nueces County

Corpus Christi Ref. Co. No. 1 J. R. Howington, O. and M. Oliver Sur. No. 156. 10¾-in. csg. 527 ft.; T.D. 5,385 ft.; prep. to sdtrk.

Refugio County

H. J. Porter et al No. 1 Lambert, J. Powers and Hewitson Sur. Drlg. sh. 4,610 ft.

San Patricio County

L. Bob No. 2 Green, T. T. Williamson Sur. S.D. 7,100 ft.
Humble O. & R. Co. No. 1 Smith and Talbert, Lot 2, sec. 37. T.D. 4,836 ft.; rng. 7-in. csg.
G. E. Smith No. 1 French, Henry S. Day Sur. S.D. 5,713 ft.; abd.

Starr County

O. C. Borah No. 1 P. G. Garcia, Juan Salinas Sur. Drlg. sh. 620 ft.
O. C. Borah No. 2 Martinez, J. Salinas Sur. Drlg. 250 ft.
O. C. Borah No. 7 Martinez, Joaquin Salinas Sur. Drlg. 378 ft.
L. Collins No. 1 Francisco B. Guerra, Santa Cruz Gr. T.D. 6,609 ft.; well blew out; cutting out D.P.
Henshaw-Davis No. 1 Garcia, M. M. Garcia Sur. Loc.
C. H. Lewis No. 1 Guerra, Juan Leal Sur. T.D. 1,505 ft.; abd.

Travis County

I. Ripp No. 1 Thaxton, Santiago De Valle Gr. R.U.
Texas Empire Trading Co. No. 1 E. E. Jourdan, Santigo Del Valle Gr. Drk.

Victoria County

W. V. Bowles No. 2 Robertson, T. C. Burnham Sur. Loc.

Webb County

Anderson & Moore No. 1 Benavides, R. Benavides Sur. Bldg. drk.
C. C. Bonner No. 1 Lewis, W. P. Rutledge Sur. 460. Loc.
French Oil Co. No. 4 Benavides, G.C.S. D.&R.G.N.G. Sur. 1121. T.D. 2,205 ft.; abd.
W. S. Hill No. 1 Adami, A.B.&M. Sur. 345. S.D. 1,205 ft.; abd.
Randon Oil Co. No. 1 Swift, Sur. 746. T.D. 1,610 ft.; abd.

Willacy County

Magnolia Pet. Co. No. 1 Armendaiz, San Juan DeCarricitos Gr., Sh. 4. T.D. 9,643 ft.; 8⅝-in. csg. 9,640 ft.; drlg. plg.
Salvieja Oil Corp. No. 2 Garcia Ld. Co. Blk. 118. Cg. sh. 8,258 ft.

Williamson County

Marion Aldridge No. 1 Kroschewsky. T.D. 1,033 ft.; 7-in. csg. 969 ft.

Zapata County

R. B. Bryant No. 1 Flores, La. Huerta Sur. T.D. 1,556 ft.; stk. D.P.; jnkd. hole; skd. drk. 45 ft. north.
Falcon Oil Co. 1½ Aquire, Sh. 28-A. T.D. 2,274 ft.

EAST TEXAS

(Border Counties)

Rodessa—Cass County

G. H. Chamblee No. 1 White & Walker, R. Potter Sur. T.D. 6,201 ft.; P.B. 6,153 ft.; tstd. 2 jts. mud at 6,121-54 ft.; D.&A.

Bowie County

King Oil Corp. No. 1 Watts, Geo. Brinlee Sur. Prep. rig 4,004 ft.

Harrison County

Ark.-La. Gas Co. No. 1 C. M. Abney, E. Little Sur. T.D. 4,820 ft.; set 7-in. csg. 2,350 ft.; drlg. 3,375 ft.; (cor.).

Marion County—Rodessa

Ark.-La. Gas Co. No. 1 Hill, Gillespie Sur. Set 7-in. csg. 5,968 ft.
Arkansas-Louisiana Gas Co. No. 1 Hollands, Hanks Sur. Set 7-in. csg. 6,092 ft.; T.D. 6,121 ft.; P.B. 6,112 ft.; tstd. S.W.; perf. 7-in. csg. 6,090-95 ft.; tstd. S.W. and S.O.&G.; sqzd. 6,121-6,100 ft.; drld. out to 6,106 ft. and tstd. dry; acdzd. 1,500 gal.; tstd. S.W.; cd. to 6,131 ft.; set 135 ft. of 5-in. at 6,131 ft. and perf. 6,090-6,106 ft.; tstg.
Ark.-La. Gas Co. No. 2 Holland, Hanks Sur. Drlg. anhy.&sh. 5,767 ft.
Ark.-La. Gas Co. No. 1 Howard, Thos. Gillespie Sur. Set 7-in. csg. 6,000 ft.: T.D. 6,030 ft.; tstd. S.O. after 1,500-gal. acid.; comp.; 17 B.P.H. on ¼-in. ck.
Ark.-La. Gas Co. No. 1 Pitts, C. Lockhart Sur. Hill sd. 5,918-21 ft.; tstd. est. 30,000,000 ft. gas; 300 ft. of fluid in hole; top Dees 6,145 ft.; drlg. sh.&L. 6,764 ft.
Cable Tool Drlg. Co. No. 1 Henderson, U. Ewing Sur. Drlg. 1,542 ft.

Dunn & Fisher No. 1 G. F. Whitfield, Bennington Sur. Set 5½-in. csg. 6,048 ft.; tstg.; T.D. 6,085 ft.; comp. 457 B. P.D.; ¼-in. ck.
Geo. Echols No. 2 Whitfield, Bennington Sur. Drlg. L.&sh. 3,878 ft.
Gulf Oil Corp. No. 2 Grubaugh, Coy Sur. Drlg. L.&sh. 5,090 ft.
Gulf Oil Corp. No. 4-A Henderson, Bennington Sur. Drlg. sh.&L. 4,715 ft.
Heyser, Heard & Clardy No. 1 Brantley, Bennington Sur. T.D. 6,018 ft.; comp.; 440 B.P.D.; ¼-in. ck.
Heyser, Heard & Clardy No. 2-B Henderson, Ewing Sur. Comp.; 21 B.P.H.; ¼-in. ck.; 7-in. at 6,030 ft.; T.D. 6,065 ft.
Heyser, Heard & Clardy No. 4-B Henderson, U. Ewing Sur. Drlg. sh. 1,975 ft.
Hollandsworth Drlg. Co. No. 1 Graham, Hanks Sur. Drlg. sh.&L. 4,104 ft.
Ohio Oil Co. No. 1 Mosley, Francis Sur. Drlg. L.&sh. 4,485 ft.
Phillips Pet. Co. No. 1 Beard, Bennington Sur. Drlg. 135 ft.
Phillips Pet. Co. No. 1 Henderson, Gillespie Sur. Set 7-in. csg. 6,039 ft.; T.D. 6,075 ft.; comp.; 363 B.P.D.; ¼-in. ck.; perf. 5,954-66 ft.
Rice Drlg. Co. No. 1 Haynes, Coy Sur. Drlg. L.&sh. 4,295 ft.
J. C. Robbins et al No. 1 J.&N.W. Ry., Bennington Sur. Comp.; 25 B.P.H.; ¼-in. ck.; T.D. 6,030 ft.
Shell Pet. Corp. No. 1 Boykin, Gentry Sur. Drlg. sh.&sd. 2,910 ft.
Shell Pet. Corp. No. 1 Goodrow, Hanks Sur. Set 8⅝-in. csg. 1,047 ft.
Shell Pet. Corp. No. 1 Schluter, W. Smith Sur. Cg. 6,015 ft.
Shell Pet. Corp. No. 1 Whelan, Thos. Gillespie Sur. Set 5½-in. csg. 5,966 ft.; T.D. 5,993 ft.; swbd. S.O.; acdzd. with 2,000 gal.; flwd. 6 B.P.H.; ⅛-in. ck., with gas-oil ratio of 18,000 to 1; recmtd. csg. 5,993 ft.
Union Prod. Co. No. 6 Hutchinson, Coy Sur. Set 7-in. at 6,096 ft.; comp.; 710 B.P.D.; 24/64-in. ck.; T.D. 6,107 ft.
Union Producing Co. No. 7 Hutchinson, Coy Sur. Drlg. anhy. 5,867 ft.

Panola County

Texas Co. No. 1 Claude Adams, T. Cox Sur. T.D. 5,940 ft.; set 9⅝-in. csg.; drlg. 6,757 ft.

WEST TEXAS WILDCATS

Andrews County

J. Donnelly et al No. 1 University, sec. 16, Blk. 14, University Sur. Drlg. 3,360 ft.
Rogers & Rogers No. 1 O. B. Holt, P.S.L. Sur. C.O. 4,541 ft.
Seaboard Oil Corp. No. 1 Munger-Nix sec. 1, Blk. A-4, P.S.L. Sur. Swabbed 50 B.O.P.D. 4,526 ft.
Seaboard Oil Corp. No. 1 Thornberry, sec. 8, Blk. 42-A, P.S.L. Sur. Set 7-in. 4,275 ft.
H. C. Wheeler No. 1 T. M. Gardner, sec. 15, Blk. A-35, P.S.L. Sur. Drlg. 3,816 ft.

Bailey County

Duffey & Etz No. 1 Enochs, Tract 66 League 182, Floyd Co. School Lands Sur. Drlg. 4,050 ft. in new hole.

Brewster County

F. C. Dodson No. 1 Texas American Synd., sec. 66, Blk. 10, G.H.&S.A. Sur. Fsg. 7,785 ft.

Cochran County

Helmerich & Payne No. 1 Westheimer & Daube, Lab. 14, Leg. 147. M.I.R.
Texas Co. No. 1 Mallett Ld. & Cattle Co. sec. 7, Blk. G, P.S.L. Sur. W.O.C. 4,800 ft.

Coke County

H. E. Ogden No. 1 Rawlins, sec. 390, Blk. B-21. Fighting cave 3,120 ft.
Barnett Pet. Co. No. 1 J. R. Mims, sec. 20 Blk. W, T.&P. Sur. W.O.C. 1,635 ft.

LEGAL

U. S. Department of the Interior, U. S. Land Office, Cheyenne, Wyoming. Notice is hereby given that the following lands are offered to the responsible qualified bidder of the highest bonus per acre for leasing, pursuant to section 17 of the act of February 25, 1920 (41 Stat. 437), as amended by the act of August 21, 1935 (49 Stat. 674) at the royalty rate scale in the lease form shown in circular 1386: Unit No. 1, lot 4 (NW¼ NW¼) Sec. 2, 40.15 acres; Unit No. 2, SW¼ SW¼ Sec. 4, 40 acres; and Unit No. 3, NW¼ SW¼ Sec. 8, 40 acres, all in T. 35 N., R. 65 W., 6th P.M., in the Lance Creek oil and gas field, Wyoming. Bids will be received on the separate units but two or more units awarded to the same purchaser may be included in a single lease. Said units will be offered for sale at public auction at this office at 10:00 A.M. on May 16, 1938. The successful bidder must deposit on the date of the sale, with the Register of the Cheyenne land office, certified check on a solvent bank, or cash, for one-fifth of the amount bid by him, and file the showing of qualifications to receive a lease, required by section 7 of General Land Office circular 1386. The remaining four-fifths, together with the annual rental in advance, at the rate of $1 per acre, must be paid prior to the issuance of the lease. The bidders are warned against violations of the provisions of section 59 of the U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Register.

Crane County

Magnolia Pet. Co. No. 1 University, sec. 16, Blk. 30, University land, 3½ mi. NW of Church-Fields pool. Filled 250 ft. with oil; T.D. 3,244 ft.

Crockett County

W. L. Bradley et al No. 1 Hoover, sec. 1, Blk. 1. Drlg. 1,727 ft.

Choate & Hogan No 1. University, sec. 17, Blk. 14, University Sur. P.B. 1,538 ft.; W.O.C.

Moore Bros. No. 1 Perner, sec. 37, Blk. 2, I.&G.N. Sur. Drlg. 9,086 ft.

Oldhausen No. 1 Owens, Carnam Sur. Loc.

W. F. Yates No. 1 Hoover, sec. 6, blk. 1, G.C.&S.F. Sur. Sp. and S.D.

Culberson County

Collins & Brewer No. 2 C. M. Caldwell, sec. 14, Blk. 42, P.S.L. Sur. Spudding.

Harry J. W. Nichaus No. 1 C. M. Caldwell, sec. 15, Blk. 109, P.S.L. Sur. Drlg. 1,143 ft.

Dickens County

J. F. Marrisey No. 1 I. J. McMahan, sec. 319, Blk. 1, H.&G.N. Sur. Drlg. 750 ft.

Ector County

Stogner et al No. 1 Hendrick, sec. 4, Blk. 43, T.&P. Sur. S.D.O. 1,190 ft.

El Paso County

Tri-State Oil Co. No. 1 Kinkel. Re-rng. 4-in. 3,571 ft.

Floyd County

Mills Bennett No. 1 T. Montgomery, F. J. Latham Sur., 6 mi. S of Floydada. Drlg. new hole 4,408 ft.

Gaines County

C. M. Cope et al No. 1 Riley, Blk. G, sec. 249, W.T.R.R. Sur. M.I.M.

Eastland Oil Co. No. 1 R. C. Dunbar, sec. 24, Blk. A-12, P.S.L. Sur. Drlg. 4,205 ft.

Finley & Cherry No. 1 P. W. Dalmont, sec. 6, Blk. A-21, P.S.L. Sur. Fsg. 280 ft.

M. B. K. Drlg. Co. No. 1 A. L. Wasson, sec. 52, Blk. AX, P.S.L. Sur. Drlg. 4,168 ft.

Garza County

Gulf Oil Corp. No. 1 Swanson, sec. 25, Blk. 2, H.&G.N. Sur. Drlg. 3,060 ft.

Glasscock County

O. B. Greathouse No. 1 Burns, sec. 221, Blk. 29, W.&N.W. Sur. M.I.S.T.

Hockley County

Gulf Oil Corp. No. 1 M. G. Gordon, sec. 12, Blk. X, P.S.L. Sur. Prep. P.B. 5,062 ft. C.O. est. 100 bbls. oil.

Gulf Oil Corp. No. 1 Mallett Ld. & Cattle Co., sec. 6, Blk. X, P.S.L. Sur. Tstg. 2½ gal. salt wtr. hr.

Honolulu Oil Co. No. 1-77, Labor 77. League 37, Zavalla Co. Sch. Lds. Drlg. 1,919 ft.

Howard County

Lockhart Oil Co. No. 1 Hussinger, sec. 67 Blk. 29, W.&N.W. Sur. Comp., 936 B.O.P.D.

Lockhart Oil Co. No. 1 Scott, sec. 86, Blk. 29, W.&N.W. Sur. Drlg. 1,683 ft.

Moore Bros. No. 1 W. P. Edwards, sec. 44, Blk. 30, T.&P. Sur. Drlg. 2,750 ft.

Texas Co. No. 1 H. H. Wilkinson, sec. 32, Blk. 34, T.&P. Sur. Drlg. 2,160 ft.

Hudspeth County

Haymon Krupp Oil & Ld. Co. No. 1 Thaxton, SE¼ sec. 34, Blk. 74, Twp 6 Drlg. 4,207 ft.

Haymon Krupp No. 1 Briggs, sec. 24, Blk 73, Twp. 7, T.&P. Sur. Drlg. 3,788 ft.

Jeff Davis County

Joiner Oil Corp. No. 1 Jones-Coffield. Drlg. 3,570 ft.

Kent County

Thad A. Bryant Jr. No. 1 Haggins et al, sec. 118, Blk. 1, H.&G.N. Sur. Bldg drk.

Thad A. Bryant, Jr., No. 1 House, sec. 10, Blk. 1, H.&G.N. R.R. Sur., 6,000-ft. test. S.D. 200 ft.

Lynn County

John L. Baldridge No. 1 Alma Lbr. Co., sec. 151, H.E.&W.T. Sur. S.D.O. 4,415 ft.

Menard County

G. A. Clements No. 1 Murchison, sec. 90 B.S.&S. Sur., 8 mi. E of Menard. D.&A. 1,298 ft.

Forest Dev. Co. No. 1 Corbell, J. H. Gibson Sur. No. 163. Loc.

C. D. Haggerty No. 1 Callon, sec. 36, Jno Franz Sur. S.D. 445 ft.

Hartzell-Nown & O'Hara No. 1 Wilhelm, sec. 24, Blk. A-1795, Indianola R.R. Sur. Drlg. 270 ft.

Pecos County

Ed Fainey No. 1 Trees, sec. 63, Blk. 8, H.&G.N. Sur. Fsg. 2,055 ft.

J. D. Kugle, Jr., No. 1 W. C. Jackson, sec. 120, Blk. 8, H.&G.N. Sur. R.U.M.

Carl S. Leidecker No. 1 Iowa Trust, sec. 73, Blk. 10, H.&G.N. Sur. Drlg. 47 ft.

Magnolia Pet. Co. No. 1 McKee. R.U.R. 5,444 ft.

E. R. Minahall et al No. 1 Haynie, sec. 28; Blk. 146, T.&St.L. Sur. M.I.M.

S. Thompson No. 1 Elsinore Cattle Co., sec. 54, Blk. D, G.C.&S.F. Sur. T.D. 7,212 ft.; drlg. iron at 7,172 ft.

Trans-Pecos Oil Co. No. 1 Gallagher. T.&P. Sur. Drlg. 1,940 ft. last report.

Trans-Pecos Oil Co. No. 3-A Papham. G.H.&S.A. Sur. U.R. 2,024 ft. last report.

Wilcox O. & G. Co. No. 1 Serf, sec. 2" Blk. 130, T.&St.L. Sur. Drlg. 4,114 ft.

Presidio County

L. C. Brite No. 4 fee, C NW¼ sec. 113, Blk. 12, G.H.&S.A. Sur. Drlg. 4,800 ft.

Reeves County

Grisham Hunter Corp. & N. A. Grisham No. 1 Geo. Daniel, sec. 40, Blk. 58, T.&P. Sur. Drlg. 1,212 ft.

Ohio Oil Co. No. 1 Papham, sec. 18, Blk. 54, T.&P. Sur. U.R. 2,380 ft.

Runnels County

E Z Oil Co. No. 1 B. Fletcher, E. C. Good Sur. T.D. 4,394 ft.; P.B. to 4,360 ft.; S.D.O. 4,384 ft.

Stevens & Glober No. 1 Fowler, sec. 150. E.I.R.R. Sur. Drlg. 1,230 ft., last report.

Schleicher County

J. M. Cooper No. 2 B. Page, sec. 40, Blk. L, G.H.&S.A. Sur. S.D. 5,004 ft.

Tex-Tor Oil Corp. No. 1 Judkins & Spencer, C of SW¼ sec. 33, Blk. A, A.&B. Sur. Drlg. 6,320 ft.

Scurry County

Coffield & Guthrie No. 1 E. E. Spears et al, sec. 130, Blk. 97, H.&T.C. Sur. M.I.M.

Robinson Drlg. Co. No. 1 Martin, sec. 147, H.&T.C. Sur. P.B. 2,500 ft.; S.D.

T. G. Shaw Oil Co. No. 1 First Natl. Bank Fsg. 2,420 ft. last report.

Sterling County

Loffland Bros. & Moore Bros. No. 1 D. D. Parramore, sec. 23, Blk. 2, H.&T.C. Sur. Drlg. 477 ft.

J. W. Sward No. 1 Brennand, sec. 107, Blk. 2, H.&T.C. Sur. S.D. 968 ft.

Stonewall County

Bert Fields No. 1 J. M. Lee, J. E. Pierson Sur. Spd.&S.D.

General Crude Oil Co. No. 1 J. D. Smith, sec. 371, Blk. 2, H.&T.C. Sur., 12 mi. N Rotan. Fsg. 3,505 ft.

Swanson & Parriott No. 1 H. T. Carlisle, sec. 293, Blk. D, H.&T.C. Sur. Drlg. 3,536 ft.

Terrell County

D. & S. Oil Co. No. 1 Sam Bell. S.D. 960 ft., last report.

Terry County

L. E. Holtz No. 1 P. J. Ross, sec. 6, Blk. D-14, C.&M.R.R. Sur. Drlg. 1,980 ft.

Tom Green County

Humble O. & R. Co. No. 1 Lewis & Ward law, sec. 5, Blk. 17, H.&T.C. Sur. Tstg. 7,198 ft.

Southern Cross Oil Co. No. 1 J. W. Wilson, sec. 30, Blk. H, A.B.&M. Sur. Loc.

Spinner No. 1 Reed, Mason Ferry Ranch Sur. S.D.O. 3,900 ft.

Upton County

Flippen & Hancock No. 1 Shirk Est., sec. 7, Blk. 3, M.K.&T. Sur. Drlg. 1,105 ft.

Holland & Maverick No. 1 Halff, sec. 6, Blk. A, C.C.S.D.&R.G.N.G. Sur. Drlg. 3,325 ft.

J. S. Pitman No. 1 D. Elder, C.C.S.D.& R.G.N.G. Sur., Blk. 3, sec. 14. Comp.; D.&A. at 3,065 ft.

W. D. Riser et al No. 1 King Ranch Oil & Lignite Co., sec. 8, Blk. 3, M.K.&T. Sur. S.D. 730 ft.

Standard of Texas No. 1-10 University, Univ. Sur., Blk. 14, sec. 10. Loc.

Val Verde County

J. F. Carter et al No. 1 Seller & Sons, sec. 34, Blk. A, I.&G.N. Sur. Spd. and S.D.

Ward County

Cities Service No. 2 Brandenburg, sec. 4, Blk. 32, H.&T.C. Sur. Prep. run tubing 2,096 ft., last report.

M. J. Delaney No. 1 J. E. Cooper, H.&T.C. Sur. Tstg. 2,092 ft.

J. E. Fitzpatrick et al No. 1 H. B. Carr sec. 125, Blk. 34, H.&T.C. Sur. S.D.R. 1,115 ft.

J. E. Fitzpatrick et al No. 1 F. K. Dyer, sec. 135, Blk. 34, H.&T.C. Sur. S.D.R. 2,500 ft.

Hoss & Downey No. 1 Meyers, sec. 17, Blk. 32, H.&T.C. Sur. Spd. and S.D.

Hoss & Downey No. 1 Ross Avery, sec. 36, Blk. 1, H.&T.C. Sur. S.D. 1,940 ft.

A. E. Lynch No. 1-A Johnson, sec. 8 Blk. 32, H.&T.C. Sur. Drlg. 1,420 ft.

Mahree No. 1 Wilson, sec. 133, Blk. 34, H.&T.C. Sur. S.D. lost tools at 5,099 ft.

Patillo & Webster No. 1 Johnson. Tstg. 1,990 ft.

O. E. Schkode No. 1 Boogher, sec. 1, Blk. 32, H.&T.C. Sur. Drlg. 240 ft.

Texas Co. No. 1-F Univ., Univ. Sur., Blk. 16, sec. 15. Loc.

L. F. White et al No. 1 Rector-Monroe, E cor. sec. 3, Blk. 1, W.&N.W. Sur. S.D. 4,710 ft.

Winkler County

Ed. L. Gelder No. 1 R. D. Kessler & F. Kessler, sec. 14, Blk. B-3, P.S.L. Sur. Loc.

Yoakum County

Bahago & Bond Oil Corp. No. 1 J. L. West, sec. 607, Blk. D, J. H. Gibson Sur. S.D.O. 5,393 ft.

Gulf No. 1 J. C. Futch, sec. 796, Blk. D. J. H. Gibson Sur. C.O. 5,170 ft.

Gulf States Oil No. 1 Graham, sec. 267, Blk. 3, J. H. Gibson Sur. R.U.R.

Heimrick & Payne No. 1 S. O'Dowd, sec. 896, Blk. D, J. H. Gibson Sur. Drlg. 3,900 ft.

Humble No. 1 Abilene State Bank, sec. 37, Blk. AX, P.S.L. Sur. Tstg. 5,005 ft.

Texas Co. No. 1 Walker, sec. 794, Blk. D ... 3,656 ft.; T.D. 5,180 ft.; P.B. 5,162 ft.; tstg. 5,192 ft.

E. C. TEXAS WILDCATS

Anderson County

Tide Water-Seaboard No. 2 J. Reagan. J. Adams Sur. Tstg. 5 B.O.P.D., 5,282 ft.

Angelina County

J. C. Bonham No. 1 Cameron Lbr. Co., E. Miller Sur., 3 mi. SE of Zavalla. S.D. 1,630 ft.

J. C. Bonham No. 3 Cameron Lbr. Co., E. Miller Sur., 3 mi. SE of Zavalla. Drlg. 621 ft.

Ginter Bros. No. 4 Copes Heirs, J. Morin Sur., 3 mi. S of Dibol. Loc.

B. L. Hoffman No. 1 Jones, W. W. Hales Sur., 8 mi. SW of Huntington. Drlg. 30 ft.

Cherokee County

Bunn Drlg. Co. No. 1 C. Bounds, W. H. Walters Sur., 2½ mi. SE of Lone Star. Drlg. 780 ft., last report.

J. G. Mayo et al No. 1 J. H. Bowlery, W. H. Walters Sur. Drlg. 2,900 ft., last report.

Merica Oil Co. No. 1 New Birmington Dev. Co., Levi Jordan Sur., ¾ mi. S of Rusk. D.&A., 5,276 ft.

Dallas County

Markraley No. 1 R. S. Morris, C. Gibbs Sur., 2 mi. S of Grand Prairie. Loc.

Plaza Oil Co. No. 1 Davidson, Marchants Sur., 1 mi. NW of Seagoville. S.D. 2,257 ft.

Franklin County

White-McGee & Harper No. 1 Harper, W. N. Dawson Sur., on Franklin-Hopkins Co. line, 6 mi. SW of Hagansport. D.&A., 4,600 ft.

Gregg County

Humble O. & R. Co. & Gulf O. Corp. No. 1 E. Robertson, M. Mann Sur., 2½ mi. SW of Longview Trinity test. El. 273 ft. Drlg. 9,588 ft.

Henderson County

Howard Pet. Co. No. 1 H. W. Barton. A J. Allen Sur. Drlg. 3,820 ft., last report.

Jones-Mallory No. 1 A. Mallory, T. S. Mitchell Sur., 6 mi. SW of Mabank. S.D. 107 ft.

Houston County

Peyton Bros. No. 1 J. N. Daniels, J. M. Procella Sur., ¼ mi. N of Procella. Drlg. 5,389 ft.

Limestone County

J. S. Cosden, Jr. No. 1 J. J. Bower, J. Breeding Sur., near Prairie Hill. Rng. csg. 602 ft.

Stanolind O. & G. Co. No. 1 T. Norris, in Thresher Sur., 5 mi. N of Kosse; 6,500-ft. test; elev. 528 ft. Tstg. 3,506 ft.

McLennan County

Chapman & Kahn No. 1 Carl Hartsman, B. C. Walters Sur., 1½ mi. S of McGregor. S.D. 1,326 ft.

Kilgore No. 1 J. M. Marrs, J. S. Rutland Sur., 2 mi. S of Bosque. Drlg. 1,271 ft.

Navarro County

G. W. Gibson No. 2 Dr. J. H. Edgar, M. Meazel Sur., 3½ mi. S of Richland. Fsg. 1,732 ft.

Natural Pet. Co. No. 1 Karen Brown, W. T. Turner Sur., 2 mi. E of Roane. S.D. 1,735 ft.

Mrs. Jane Robinson No. 1 Fortson Bros.-Ell Smith Sur., 5 mi. NE Corsicana Drlg. 2,610 ft.

Smith County

H. L. Hunt et al No. 1 S. H. Bradly, T. P. Payne Sur., 10 mi. E of Tyler at Chappel Hill. Drlg. 5,747 ft.

Titus County

Lee Umbernhour No. 1 J. M. Sykes, J. Mathews Sur., 1 mi. N of Winnsboro. Drlg. 3,640 ft.

Trinity County

Bilinoski et al No. 1 Trinity State Bnk., B. F. Wright Sur., 3 mi. S of Trinity. Cg. 2,912 ft.

Boone & Jordan No. 1 U. S. Crouch, Joel Clapp Sur., 7 mi. N of Trinity. Loc.

Gassage et al No. 1 Mrs. C. H. Elliot, Joel Clapp Sur., 6½ mi. N of Trinity. Drk.

Upshur County

E. J. Dupree No. 1 W. A. Lawrence, R. Polly Sur., 4 mi. S of Gilmer. Loc.

Tom Hunter and American Liberty No. 1 J. P. Carter, J. H. Fields Sur. Drlg. 8,199 ft.

RANGER (CENTRAL TEXAS) DISTRICT

Callahan County

Joe Gallagher No. 1 W. T. Harris, 200 ft. from S line, 1,050 ft. from E line sec. 347, G. W. Denton Sur. 2,000-ft. test, 5 mi. N Oplin.

J. H. Howell No. 1 E. I. Vestal, 1,149 ft. E line, 1,000 ft. N line, Jesse Dyson Sur., 2 mi. NE Cross Plains, rotary to 4,000 ft. Surf. to 100 ft.; S.D. at 600 ft.

J. C. Jackson et al No. 1 Thompson, 2 mi. S. Eula, sec. 30, B.B.B.&C. Sur. S.D 1,956 ft.

Wittmer Oil & Gas Properties, Inc., No. 1 R. D. Williams et al, 300 ft. from N line, 467 ft. from W line sec. 2,269, T.E.&L. Sur., 2 mi. NE Putnam, 4,500-ft. test. Set 12½-in. at 1,048 ft.; show oil 1,795-1,803 ft.; drlg. 1,965 ft.

Coleman County

S. M. Devine et al No. 1 Masterson, 2 mi. W of Burkett, Asa Wickson Sur. Drlg. 1,680 ft.

Garrett Oil Co. No. 1 W. S. Smith et al., 4 mi. SE Coleman, J. Thiele Sur. 2,300-ft. test.

Comanche County

N. D. Gallagher et al No. 1 Mrs. B. I. Terry, Desdemona pool, N. H. Kuykendall Sur. S.O. in Ellenburger; 5 gal. sulfur and salt water on D.S. test 4,917 ft.; drlg. 4,955 ft.

Dobbs Oil Co. No. 1 Hodges, sec. 11, Blk 2, H.&T.C. Sur. Comp. 20 B.P.D.. T.D. 2,708 ft.

Eastland County

G. D. Chastain et al No. 1 Weddington, 4 mi. N. Cisco, sec. 496, S.P.R.R. Sur. T.D. 4,079 ft.; plugging back.

Dobbs Oil Co. No. 1 Greer, J. E. Hardy Sur., Ellenburger test. Drk.

Hayner, Reaves & Hose No. 1 P. L. Larkin, 3 mi. NW Rising Star, 912 ft. from W line, 546 ft. from S line, NW¼, sec. 40-2, E.T.R.R. Sur. S.D. for water at 1,200 ft., T.D.

Nell A. Moore No. 7 Holcomb Heirs, 970 ft. from W line and 600 ft. from N line, SW¼ 1-4, H.&T.C. Sur. Loc.

Fisher County

Forest Dev. Corp. & Daube No. 1 L. G. Bennett, 660 ft. from N & E lines, sec. 51-3, H.&T.C. Sur. Rotary to 4,500 ft.; 3 mi. SW of Rotan.

Owens-Snebold & A. C. Varner No. 1 J. H. Milsap, 3,500-ft. wildcat, 2 mi. NW McCaulley, 330 SL 330 WL, sec. 61-2, H.&T.C. Sur. Drlg. 1,110 ft.

Tom C. Patton, Inc. No. 1 John B. Stribling, 660 ft. from S and E lines, sec. 110-3, H.&T.C. Sur. Pits; 4,500-ft. test.

Shell Pet. Corp. Corp. No. 1 J. H. Vaughn, 330 ft. from N and E lines, sec. 20s-3, H.&T.C. Sur., 4,000-ft. test.

Haskell County

Fain-McGaha Oil Corp. No. 1 T. G. Hendrick, C W½ sec. 104, Indianola Ry. Sur. Set 150 ft. of 12½-in.; drlg. 1,600 ft.

J. W. and A. E. McMillan No. 1 A. E. Pardue, 440 ft. from N and W lines, S½ M. Collum Sur. No. 4 A-685. Rotary to 3,500 ft.; R.U.R.

Jones County

H. G. Daniels & Dale H. Dorn No. 1 F. T. Moore, 220 ft. from W line, 330 ft. from S line, Moore 115 sc. in John Winter Sur. 138. Drlg. 1,900 ft.

W. W. Fondren No. 1 Cox-Manley, 330 ft. from S line and 330 ft. W of C of S line of C. B. Sheppard Sur. 70. Fsg. 1,888 ft.

F. A. Gillespie & Sons No. 1 J. N. Hatfield, 3 mi. N Noodle Creek field, 330 from N and E lines, 80-ac. tr. in M. Northington Sur. No. 270. Dry at 3,005 ft., T.D.

Mack Hayes and Montour Oil Co. No. 1 Chittenden, 7 mi. SE Hamlin, Subd. 18, McMullen & McGloin Sur. 337. Drlg. 3,000 ft.

Humble No. 1 I. N. Irwin, 330 ft. from S and W lines sec. 48-18, T.&P. Sur., 1½ mi. E Noodle Creek pool. Cored sat. 2,550-67½ ft.; set 6-in. 2,550 ft.; swabbed 18 B.O. and 72 B.W. in 3 hrs.; plugged back cement; rigging spudder.

Humble No. 1 R. B. Spencer, 330 ft. from S and E lines, NE¼ sec. 195, B.B.B.&C. Sur., West Avoca outpost. Spudded.

Thos. D. Humphrey No. 2 N. D. Newton, 330 ft. from W line, 990 ft. from S line, Jas. Halfpenny Sur. 139. S.D. at 2,224 ft., T.D.

Iron Mountain No. 1 D. J. Herbst, 5 mi. E Hamlin, 330 ft. from N and E Sub. 18, Austin Williams Sur. 339. Set 10-in. 2,245 ft.; H.F.W. 2,770-80 ft.; drlg. 2,825 ft.

F. M. Loop No. 1 W. T. Young, 330 ft. from N line, 253 ft. from E. L. Young 276-ac., D. Bustillos Sur. 189. Loc.

F. W. Martin No. 1 B. N. Herndon, 330 ft. from S and W of NW sec. 1, M.E.&P. Sur. Collapsed 8-in. at 2,567 ft., T.D.

F. W. Merrick et al No. 1 C. A. Cox, cent. Cox 119-ac. tr., J. H. Hughes Sur. No. 201. Collapsed 8-in. at 1,700 ft., T.D.; cementing.

B. H. Roth No. 1 D. A. Kinney, 4,000-ft. test, 330 ft. from S and E of NW sec. 7-4, H.&T.C. Sur. Drlg. 3,260 ft.

Shaheen Oil Co. and Big Six No. 1 P. L. Telford, 220 ft. N and W lines, E½ SW¼ sec. 49-15, T.&P. Sur. Spudded.

Jay Simmons No. 1 W. T. Young, 302 ft. from S, 342 ft. from E, 37½-a. lease, D. Bustillos Sur. 189.

Stanton & Miller No. 1 Gaither, 4½ mi. N of Anson, sec. 38, B.B.B.&C. Sur. S.D. 2,150 ft.

Joe A. Worsham et al No. 1 J. H. Commons, 330 ft. from E line, S½ E 80-ac., Subdiv. 8, A. W. Hill Sur. No. 4. Drlg. 2,050 ft.

Nolan County

Hantho-Nelson, Inc., No. 1 J. H. Withers, C SW¼ sec. 65-21, T.&P. Sur. Wildcat to drill 4,000 ft. Spd. to 200 ft. W.O. rotary.

Palo Pinto County

W. H. Clement No. 1 Federal Life Ins. Co., 2 mi. W Mineral Wells, sec. 51, T.&P. Sur., Blk. A (E of B). Drlg. 1,710 ft.

Shackelford County

Danciger No. 2 J. E. McCown, 330 ft. from S and E sec. 158, B.B.B.&C. Sur., N off set to Haterius. Top Palo Pinto 3,187 ft.; cored 3,189 to 3,212 ft.; filled 1,500

ft. in oil; acidized 1,000 gals.; flowed 484 bbls. in 17 hrs.

Danciger No. 3 J. E. McCown, 300 ft. from N and E lines, S½ SE¼ sec. 158, B.B.B. &C. Sur. M.I.M.

Joe DeGrazier No. 1 Harbough, E cen part of county, sec. 1,563, T.E.&L. Sur 4,500-ft. test; H.F.W. 2,185-95; U.R. 8-in.

Forest Dev. Corp. No. 1 T. G. Hendrick, NW cor. of county, 2,600 ft. from N line and 4,300 ft. from W line of sec. 1, A.B.&M. Sur. Est. 15,000,000 ft. gas per day 1,603-17 ft.; gas 1,662-65 ft., incr. est. 4,000,000 ft., 1,680-85 ft.; est. 1,000,000 ft. 1,804-06 ft. and 1,810-15 ft.; S.S. oil and wtr. 1,864 ft.; inc. wtr. 1,880-89 ft.; set 6-in. to 2,620 ft.; wtr. 2,755 ft.; set 5-in. to 2,872 ft.; drlg.

Ungren & Frazier No. 1 J. S. McKeever, 306 ft. from W line, 354 ft. from N line, NW¼ SW ¼ sec. 14-3, H.&T.C. Sur. 3,500-ft. test.; drlg. 1,425 ft.

Stephens County

Danciger Oil Ref. Co. No. 1 Mrs. Aileen Copeland, 8 mi. SE Ivan, 1,196 ft from E line and 350 ft. from S line of sec. 1, M.E.P.&P. Sur. Fsg. blr. 4,210 ft.

Graham, Hafner, Lane & Inman No. 1 J N. Yocum, 5 mi. SE of Frankell, 25(ft. from N and E lines of farm or ap prox. 2,525 ft. from E line and 1,40(ft. from S line of John R. Carter Sur Trt. 1,000 gal acid 3,575-90 ft.; est. 25 50 bbls. per day; drlg. 3,455 ft.

I. C. Little No. 1 R. M. Rogers, NE¼ of county, 150 ft. from E line and 1,980 ft. from S line of sec. 28, T.&P. Sur. Blk. 5. Tstg. after 10,000-gal. acid 3,960-4,055 ft., 3,000,000 ft. gas; sulfur wtr. 4,490 ft., T.D.; plugging back.

Lone Star Gas Co. No. 5 R. W. Brooks, 400 ft. E and S of C of sec. 54-7, T.&P. Sur. Ellenburger test 2½ mi. N of Van Parmer pool. Spudding.

G. Willard Rich No. 1 J. W. Andrews, 330 ft. W line, 450 ft. S line, NW¼ sec. 39-7, T.&P. Sur. Set 12½-in. at 1,620 ft.

Stonewall County

Bert Fields No. 1 R. P. Pierson, C of E 80-ac., E. A. & S. M. Lee Surv. Abst. 817. Loc.

General Crude Oil Co. No. 1 J. D. Smith, SW cor. county, 330 ft. from S and E lines of sec. 371, H.&T.C. Sur., Blk. 2 Set 13⅜-in. 2,119 ft.; set 10-in. at 3,508 ft.; cmt. 150 sacks; W.O.C.

F. B. Parriott No. 1 H. T. Carlile, 330 ft. from S line, 990 ft. from E line, SW¼ NE¼ sec. 293, Blk. D, H.&T.C. Sur., rotary to 5,500 ft., 6 mi. NW of Swenson. Set 8¼-in. at 3,345 ft.; cable drlg. 3,700 ft.

Taylor County

E. P. Campbell et al No. 1 McGee & Manley, 330 ft. from N, 750 ft. from E lines, SW¼ sec. 22-16, T.&P. Sur. S.D.O. 2,460 ft.

Bert Fields et al No. 1 Sears, sec. 223, Blk. 64, H.&T.C. Sur. Drlg. 3,292 ft.

Wichita Prod. Co. No. 1 J. H. Parramore, 592 ft. from E line, 400 ft. from S line, SW¼ sec. 81-14, T.&P. Sur. Spd.

Throckmorton County

Jones & Stasney No. 1 C. T. Brockman, 330 ft. S line, 330 E line sec. 95, Comanche Indian Sur. Fsg. 700 ft.

Morris & Spoonts No. 1 Alden Bros., NW cor. county, 1,350 ft. from E line and 5,210 ft. from S line of Raymond Sanches Sur. A-248. Drlg. 1,178 ft.

White & Duncan No. 1 Reynolds Cattle Co., 330 ft. from S and W lines, NE¼ sec. 83, Comanche Indian Reservation. Spd.

Henry Zweifel No. 1 J. H. Lee, 4 mi. NE of Woodson, 930 ft. from E line and 2,011 ft. from S line of J. A. George Sur. Cg. 2,990 ft.

NORTH TEXAS WILDCATS

Archer County

Burns & Omohundro No. 1 Dr. A. B. Edwards, Blk. 44, L. P. Hunt Subd., 5,300-ft. test. Loc.

Camp Drlg. Co. No. 1 H. Harmel, sec. 2460, T.E.&L. Sur., 4,000-ft. test. Loc.

Fain-McGaha Oil Corp. No. 1 R. W. Fuller, Blk. 1, H.&T.C. Sur., 6,000-ft. test. Drk.

H. Fraser No. 1 W. M. Coleman, L. P. Hunt Subd., Blk. 57, 4,200-ft. test. Loc.

Hines & Hancock No. 1 J. L. Anderson, Blk. 23, Anderson ranch, 4,000-ft. test. Loc.

Hines & Hancock No. 1 Rex Hammond, H. Corzine Sur. A-56, 4,000-ft. test. Loc.

Kilgore-Luginbyhl & Johnson No. 1 Ford, T. M. Cecil Sur. A-982. 4,500-ft. test; drlg. 3,925 ft.

Wayne King et al No. 1 C. A. Arthur, sec. 3, G.H.&H. Sur. A-158. S.D. 210 ft.

Lacreta Pet. Co. No. 1 L. H. Farmer, W. C. Winters Sur. A-663, 4,000-ft. test. Loc.

Shappell Oil Co. No. 1 Grace Bell, Blk. 27, Clark & Plumb Sur., 3,700-ft. test. Loc.

C. W. Snoddy No. 1 Jones, T. Freeman Sur. A-134. Drlg. 2,875 ft.

Thurman & Lipscomb No. 1 L. F. Wilson, Blk. 22, A.T.N.C.L. Sur., 4,000-ft. test. Loc.

Baylor County

D. S. Kelly No. 1 W. T. Waggoner, sec. 54, T.&N.O. Sur. S.D.O. 1,200 ft.

(Continued on Page 250)

Rocky Mountain Runs

Production estimates for week ended April 9, 1938 (figures in barrels):

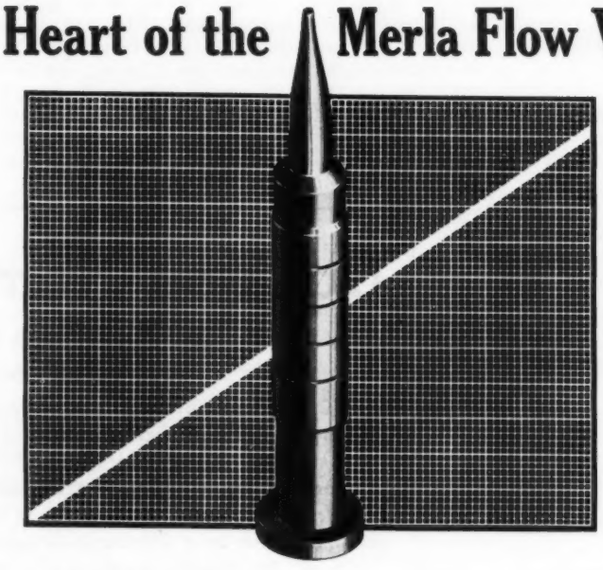
WYOMING	
Salt Creek	16,210
Big Muddy	1,290
Badger Basin	190
Black Mountain	100
Byron	560
Dallas Derby	560
Dutton Creek	60
Elk Basin	10
Frannie	980
Garland	1,900
Grass Creek	10
Hidden dome	150
Hudson	300
Labarge	1,090
Lance Creek	9,510
Lost Soldier	1,700
Medicine Bow	3,580
Midway	40
Oregon Basin	1,990
Osage	890
Pilot Butte	20
Quealy dome	820
Rex Lake	40
Rock River	1,850
South Casper	490
Poison Spider	280
Teapot	20
Warm Springs	80
Wertz	860
Total Wyoming	45,580
MONTANA	
Border	60
Cat Creek	600
Cut Bank	7,000
Dry Creek	1,580
Kevin-Sunburst	3,230
Pondera	930
Total Montana	13,400
COLORADO	
Florence	190
Fort Collins and Wellington	290
Iles dome	2,430
Moffat	350
Orchard	40
Rangely	80
Tow Creek	200
Price	510
Total Colorado	4,090
NEW MEXICO	
Cooper	5,190
Eaves	980
Eunice	26,810
Hardy	1,890
Hobbs	16,130
Jal	1,290
Langlie	3,630
Lynch	630
Lynn	830
Mattix	2,860
Monument	28,310
North Lynch	50
Penrose	5,530
Rhoades	90
Skelly	1,980
South Eunice	2,910
Vacuum	740
Artesia-Maljamar	6,960
Getty	200
Hogback	200
Rattlesnake	700
Table Mesa	90
Total New Mexico	108,000
Total Rocky Mountain region	171,070

Oklahoma State Income From Capitol Land Oil

The state of Oklahoma has received $1,642,970.82 from oil wells on state capitol lands, it was revealed by Lea M. Nichols, chairman of the state board of affairs.

Of this, $421,348.68 has gone into the general fund; $1,000,000 into the capitol building and armory fund; $20,000 is being held in escrow and $201,662.14 has been deposited to the credit of the public building fund.

"The Heart of the Merla Flow Valve"



In Gas Lift Flowing Precise Metering of Gas Results in Efficient Straight Line Production

The basic principle of gas lift being that of expanding gases and aeration, which cause the fluid to move upward in the tubing, the rate of the movement is dependent upon the amount of gas fed into the tubing—for *efficient production and low gas-oil ratio, the amount of gas should vary according to the rate of the fluid movement.*

Mere "blasting" of gas into the tubing, will not produce desired results.

The Merla is a pressure and velocity differentially operated flow valve, that automatically meters the gas according to the rate of flow in the oil string.

The heart of a Merla Flow Valve is the spring controlled pressure or metering pin. Differential can be changed quickly right at well by merely changing a calibrated spring.

The changing positions of the Merla Metering Pin resulting from the fluctuating differentials of pressure across the valve, bring an equal and uniform changing of orifice area due to this pin being based on a logarithmic curve. This uniform area change, through the entire movement of the pin, means that the volume of gas entering the rising fluid is also uniform, and proportionate to the amount of gas necessary to maintain efficient flow . . . . precise metering with both high and low pressures, also large or small volumes of gas.

Merla Flow Valves give straight line production that is both efficient and economical.

For more information about gas lift operation and the various types of Merla Flow Valves, write for a copy of the Merla Booklet.

MERLA TOOL COMPANY

Manufacturers of Oil Field Equipment

P. O. BOX 2576 DALLAS, TEXAS

PERSONAL

P. J. SWEENEY, general manager of the Pan American Refining Company in Texas City, Tex., was elected president of the Texas City Rotary Club recently.

CHESTER R. THOMAS has sailed for Karachi, India, planning to go from there into southern Iran for geological work with the Amiranian Oil Company. Mr. Thomas formerly served on the geological staffs of the Amerada Petroleum Corporation and the Skelly Oil Company, but more recently had done independent geological work in Kansas. He also had been in Mexico studying petroleum developments there. He was accompanied on his voyage to Iran by O. C. OLSON, of Tulsa, formerly with the Shell Petroleum Corporation, who also will do geological work for Amiranian.

GEORGE C. HERRMANN, for the past 28 years with the Callaway Fuel Company in Milwaukee, Wis., and since 1924 in charge of fuel oil purchases, has resigned as vice president and secretary of Callaway to become vice president and secretary of the McClain Oil Company, Milwaukee, wholesale fuel oil distributor.

E. L. GARTON, assistant chemist at the petroleum experiment station of the Bureau of Mines in Bartlesville, Okla., is in the Morningside Hospital, Tulsa, recovering from injuries suffered in a road accident last week. Mr. Garton was riding in a bus when it swerved violently in an effort to avoid collision with a truck. His left arm, thrust through a window opening, was caught by the truck and broken in three places.

ARTHUR J. KERR, president of the Engineers Club of Tulsa; HAROLD VANCE, head of the petroleum engineering department of Texas A. & M. College, Bryan; and F. B. PLUMMER and HARRY POWERS, department of petroleum engineering, University of Texas, Austin, were visitors at the monthly meeting of the Gulf Coast section of American Institute of Mining and Metallurgical Engineers in Houston last week.

J. H. CONTINO, Oil City, Pa., who entered the employ of the National Transit Company in 1903 as a messenger boy, was elected vice president and treasurer last week to succeed L. C. Longaker who died recently. Mr. Contino was also made treasurer of the National Transit Pump & Machine Company, manufacturing subsidiary. RICHARD L. LOCKWOOD was appointed assistant treasurer of both organizations; S. D. OSBORNE, superintendent of transportation of National Transit, was elected a director, and F. G. ZIMMERMAN, secretary of the National Transit Pump & Machine Company, was elected a director.

JIMMY DOOLITTLE, of the Shell Oil Company's aviation department, arrived in Los Angeles a few days ago from St. Louis, Mo.

GUY STEVENS, of New York, assistant to W. T. WALLACE in the Gulf Oil Corporation's New York producing division, has returned from a vacation in Florida.

W. P. FLOWER, formerly stationed in Mexico with the Huasteca Petroleum Company, is located temporarily in New York with the public relations division of the Standard Oil Company (New Jersey).

GLENN G. STALEY of the New Mexico oil proration office in Hobbs, was elected vice president of the Southwest production division of the American Petroleum Institute. Mr. Staley is now the state umpire and was formerly state geologist of New Mexico.

J. J. RUSSELL, former West Texas district geologist for the Sinclair Prairie Oil Company at Midland, has been transferred to the North Texas district, where his company is entering the K.M.A. development. His headquarters are in Wichita Falls.

DR. ROBERT E. WILSON, New York, president of the Pan American Petroleum & Transport Company, spent several days in Houston, Tex., visiting the Texas City refinery of the Pan American Refining Corporation and offices of the Pan American Production Company in Houston.

A. W. TRUSTY, chief chemist for the Arkansas Oil Company, Shreveport, La., presided as chairman at the Ark-La-Tex division meeting of the Western Petroleum Refiners Association last week in Shreveport. Technical and operating questions of members of the Ark-La-Tex division featured the meeting.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

"Coal Oil Johnny" Steele, who blew in a $100,000 fortune in one year in the sixties, is now a station agent at Fort Crook, Nebr. A tornado recently destroyed the railroad station and Steele's home but left him unscathed.

Mrs. Laura Jennings Kemp, wife of Rogers Kemp, Tulsa oil man, dies in a Pittsburgh hospital after an operation.

H. E. Whittlesey, inventor and manufacturer of valve cups for oil wells, dies in Corry, Pa.

Most Gulf Coast oil fields are small in area, 200 to 600 acres, but the Humble field has an extreme width of 2 miles and an extreme length of 6 miles, and has five sands from 600 to 3,200 feet deep.

20 YEARS AGO

Oklahoma boosters are still working to have the Arkansas River made navigable, and certain insiders say it will be done, all the way to Tulsa, by this time in 1919.

Mrs. J. J. Brazill, wife of the superintendent of tankage for Prairie Oil & Gas Company, and sister to James E. O'Neil, president of the company, dies in Tulsa.

Oil operations are being conducted in 86 Texas counties. Oil men are confident that some day Texas will be in a class with Oklahoma and California.

John H. Galey, famous wildcatter of the nineties, and for years a member of the firm of Guffey & Galey, large-scale operators, dies in Pittsburgh at the age of 76 years.

10 YEARS AGO

Eight billion feet of gas has been wasted in the Hendrick, Texas, field. Water is showing in 73 of the 133 wells. The field is producing around 215,000 barrels of oil per day.

Chanslor-Canfield Midway Oil Co. No. 96 Olinda in Orange County, California, is the deepest well ever drilled, having reached a depth of 8,201 feet. Second in depth is a well in Pennsylvania, 7,756 feet deep. The latter is a producing gas well.

G. H. MICHLER, of London, head of the Standard Oil Company (New Jersey) marketing operations in Latin America, arrived in New York April 12 for a conference with associates.

D. E. BUCHANAN, Tulsa, president of Hanlon-Buchanan, Inc., planned to sail Thursday of this week on the Europa with MRS. BUCHANAN for a two months visit in countries of Europe.

ED KEELER, for the past four years with Phillips Petroleum Company in its North Texas land division, Wichita Falls, has resigned to join the Shaheen Oil Company in the same city.

H. B. FELL, executive vice president of the Independent Petroleum Association of America, was the principal speaker at a division meeting of that organization in Shreveport, La., last week.

H. H. POWER, head of the department of petroleum engineering, University of Texas, has been named national chairman of the 1938 topical committee of production technology of the A.P.I. central committee of drilling and production practice.

N. M. CARROTHERS, superintendent of the Coalinga division of the General Petroleum Corporation, has completed 25 years' service with the company. He was drilling superintendent during the Santa Fe Springs boom.

H. C. WIESS, president of Humble Oil & Refining Company, Houston, Tex., has had as his guest SIR HERBERT MARLER, Canadian minister to the United States, who went to Houston to obtain first-hand knowledge of the various oil, gas and sulfur fields of the Gulf Coast.

PARAGRAPHS

A. J. HOLLAND, for the past eight years district petroleum engineer for the Texas Company in the Texas Panhandle oil field, has been transferred to the West Texas-New Mexico area with offices in Wink. He is chairman of the Panhandle chapter, production division, of the American Petroleum Institute. A successor will be elected at the next meeting.

O. W. KILLAM, South Texas wildcatter, was honored by operators of that area last Friday night at a stag entertainment sponsored by the South Texas Chamber of Commerce in the Plaza Hotel, San Antonio. Mr. Killam, who resides in Laredo, has drilled more than 1,000 tests in South Texas and during the past 17 years has opened nearly a score of producing areas. Officials of the American Petroleum Institute, Mid-Continent Oil and Gas Association, Independent Producers Association, Railroad Commission, congressmen, representatives and political leaders from Oklahoma, Texas, New Mexico and Louisiana were at the affair Friday night.

KING HOUSTON, for 15 years associated with the International Petroleum Company at Negritos, Peru, arrived in the Turner Valley field, Canada, recently, with MRS. HOUSTON and daughter, to assume the position of production superintendent of the Royalite Oil Company.

NORTON H. WEBER, Chicago, vice president of the Pure Oil Company, and SEWELL L. AVERY, Chicago, Montgomery Ward & Company board chairman, were elected directors of the Pure company at the annual meeting of stockholders last week. "It is quite possible," said HENRY M. DAWES, president, "the petroleum industry generally will not have as severe a curtailment of operations and profits this year as most industries."

W. E. HAND, chief draftsman at the Arkansas City, Kans., refinery of the Shell Petroleum Corporation for the past nine years, has been transferred to the company's refinery at Wood River, Ill.

JOHN C. R. BOETTCHER, JR., Philadelphia, Pa.; JESSE HAWLEY, Davenport, Iowa; D. D. DEMILLE, Minneapolis, and E. H. WRAY, of Algona, Iowa, were chosen additional directors of the National Association of Petroleum Retailers at the organization meeting in Milwaukee, Wis., last week. WILMER R. SCHUH, president, announced the board was putting into effect a plan to have a state deputy in each state to organize dealers and build up local organizations. Directors reaffirmed opposition to premiums, trading stamps or lotteries at gasoline stations.

L. R. THOMPSON, scout for the Bennett Petroleum Corporation, Dallas, Tex., has been transferred to Houston, Tex., where he will be in charge of offices opened by that company.

DR. W. A. CARROTHERS has been appointed commissioner to regulate the coal and petroleum industries in British Columbia, Canada. Doctor Carrothers will have supervision of the marketing of petroleum products in the province.

W. H. WILDES, Chicago, president of the Republic Natural Gas Company, formerly with operating headquarters in Corpus Christi, Tex., is moving to Dallas, Tex., the new headquarters, along with the company's office force and other officials whose offices have been in Corpus Christi.

BENJAMIN CRAFT, an instructor in the department of Petroleum Engineering at Louisiana State University, and J. H. McGUIT, assistant state geologist, is back with his classes after conducting a tour of university student engineers through several North Louisiana oil fields.

W. H. BERG, president of Standard Oil Company of California, was elected chairman of the board of the Pacific Public Service Company at the annual meeting, and J. H. TUTTLE was advanced from secretary to vice president. B. W. LETCHER was elected secretary and R. C. STONER was elected a director.

LESTER A. LUECKE, petroleum geologist, for the last 10 years with the Gulf companies in North and South America, has opened a consulting office in the Harvey-Snider Building, Wichita Falls, Tex. Mr. Luecke led the expedition into the Barco concession in 1931 when the Mellon interests regained title to the concession.

New Ideas Capture Him

Emby Kaye, who has resigned from the Skelly Oil Company to become general manager of the two new subsidiaries of the Wasatch Refining Company, Salt Lake City, Utah, is one of those men who live 24 hours ahead of today. His associates say that as soon as he gets one new idea in practical operation he dives headfirst into another. The new, the unsolved, captures his interest.

EMBY KAYE

Fresh from Harvard, Mr. Kaye enlisted in the air corps for World War service, and he served as an instructor in aerobatics (air acrobatics) in a Florida training camp. Soon after his discharge he got a job as a field hand in the Burkburnett operations of W. G. Skelly. After that he worked at the Skelly gasoline plant at Wynona, Okla., as oiler, loader, gas tester, engineer, gang foreman, and eventually plant superintendent. He continued with the Skelly Oil Company when it was organized in 1919, and three years later he was made superintendent of the natural gasoline department, with his headquarters in Tulsa. He supervised construction of plants in Oklahoma, Texas, and Arkansas. In January, 1931, upon the death of F. A. Pielsticker, he was placed in charge of refining operations. Two years later he was elected a director and vice president in charge of refining, which post he held till his resignation. Mr. Kaye has written many technical papers and articles. He was born in Atlantic City, N. J.

HAROLD C. BISHOP, independent oil man with headquarters in New York, has been visiting in Houston, Tex.

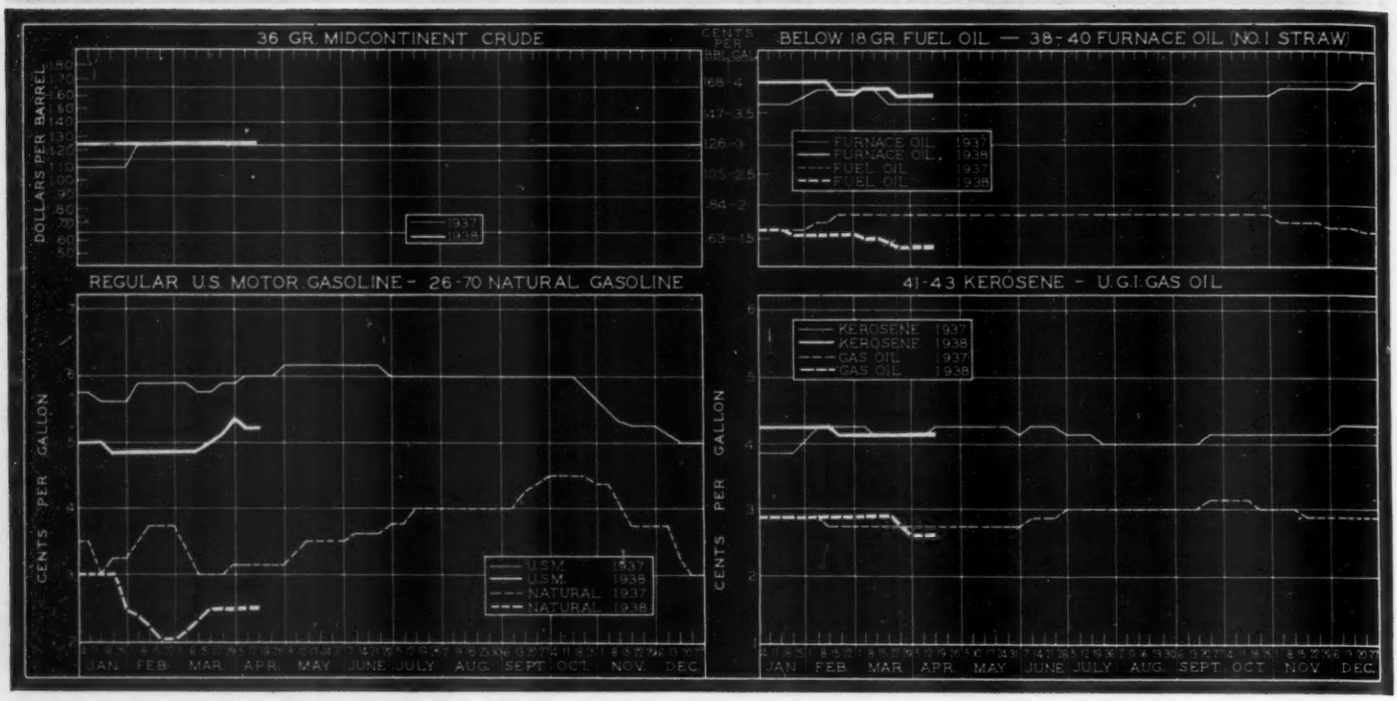
O. D. DONNELL, president of the Ohio Oil Company, Findlay, Ohio, and MRS. DONNELL are spending a vacation in Los Angeles. They expect to remain in California another week.

E. L. SMITH, independent oil operator in the Mexia and East Texas fields, has been elected a director of the Dallas (Tex.) National Bank. He is president of the East Texas Chamber of Commerce and vice president of the City National Bank of Mexia.

FRANK S. HUDSON, recently appointed chief geologist of the Shell Oil Company, has returned from an inspection trip covering all the company's California properties. Mr. Hudson has offices in both Los Angeles and at the company headquarters in San Francisco.

H. R. CULLEN, president of the Quintana Petroleum Company, Houston, Tex., is making a 10-day trip to Washington, New York, Pittsburgh and other eastern cities in behalf of the campaign which he is directing for raising funds to provide buildings for the new University of Houston.

T. J. FITCH, vice president, director and manager of pipe lines of the Magnolia Pipe Line Company and vice president and director of the Magnolia Petroleum Company, has retired from active service after 45 years' service in petroleum pipe line work. His association with Magnolia started in 1911. J. L. LATIMER, former assistant manager of the Magnolia Pipe Line Company, has been made vice president, director, and manager of that organization, and vice president of the Magnolia Petroleum Company to succeed Mr. Fitch.



Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Group 3 Refinery Market Recovering After Backset Caused by Blizzard

By T. F. SMILEY

A blizzard-bruised refinery market in the Group 3 area was getting back on its feet this week. Things had been coming on nicely when one of the worst April storms in history swept virtually the whole Mississippi Valley, bringing motor travel to a standstill in some regions and crippling it in others. In parts of the Southwest, where winter was supposed to be over, roads were blocked, plant operations hampered, and communication systems were so dislocated that sales managers in headquarters offices were unable to get in touch with distant refineries. In northern territory almanac-trusting maintenance crews had removed snow-fences from alongside highways and stored snow-plows for the summer. Then came the heaviest downfall of the year. And where it wasn't snow-drifts it was high water. Motorists were digging or sloshing their way out over the week-end.

Gasoline Movement Reviving

Notwithstanding the setback administered by a perverse weather department, refiners, not quite so chipper perhaps, nevertheless were not growling and they continued to regard the 1938 prospect as promising. Gasoline movement, which had slowed up, was showing symptoms of revival this week. Offerings were not overabundant and inventories were in fair shape. Export orders were extending a helping hand, relieving a situation at Gulf Coast terminals, where stocks had been glued an uncomfortably long time. Recent withdrawals have lowered these accumulations, and inquiries pointing to further oversea shipments are in hand.

Demand for motor fuel in the higher-octane brackets was reported running a little behind current output, without doing any visible market damage. There seemed to be a buyer for every gallon of third-grade gasoline produced and no eagerness to sell at current quotations. Among the plants shut down in recent months a large percentage made third-grade almost entirely. Some of the larger refineries are buying such third-grade as they may need, declaring it to be more economical to do that than to make it. Thus production has been narrowed. At the same time use of this grade for tractors has increased demand.

Available information indicated that some jobbers who filled their tanks just before the recent raise in freight rates are not drawing on this storage, but are meeting their day-to-day requirements by fresh purchases, figuring that if they draw from stocks now they are likely to pay higher prices when they replenish.

Natural Gasoline Quiet

Natural gasoline was quiet, with spot inquiries fewer. More material was available at the plants of small manufacturers with scant storage facilities, but the larger manufacturers expressed willingness to let the smaller concerns have the spot market undisturbed for whatever it might be worth to them. They evinced more interest in storing for the needs of a few months hence than they did in making sales at present quotations.

Inventories of neutrals and bright stocks were showing the effects of recent plant shutdowns, and prices, though unchanged, were steadier. Some refiners were reported sold out, and buyers were having increasing difficulty in finding what they wanted. Export business, if the 1938 market follows the usual pattern, should show a marked pick-up next month, imparting to this group of products a little more of the life they long have needed.

Market observers voiced belief that there would be no further price reductions of consequence in the heating oils. Overheavy inventories which had caused nervousness were believed to have been disposed of. If any unwanted material remained it probably was moved during the recent cold spell, which lit thousands of oil burners.

Refined Oil Market Barometer

Spring advance of gasoline and tractor fuels halted by storms which swept most of the country. Signs of resumption visible this week as highways were reopened. Notwithstanding refinery shutdowns and reduced operations of plants still operating, further sharp curtailments are recognized as imperative if total gasoline stocks are to be brought to an economic level by fall.

MID-CONTINENT. Gasoline improving after decline caused by storms. Naturals soft.

EAST COAST. Winter weather checks gasoline consumption. Heating oils temporarily active.

GULF COAST. Gasoline, kerosene, and fuel oils slow. General market quiet.

CALIFORNIA. All products tending to softness. Demand for most of them subnormal.

PENNSYLVANIA. Neutrals and bright stocks off. Gasoline only product showing life.

CHICAGO. Rise in gasoline consumption interrupted by severe weather. Heating oils firmer.

Tardy Winter Weather Upsets East Coast Gasoline Market

By H. STANLEY NORMAN

NEW YORK, Apr. 12.—A belated blast of winter in the Northeast, Middle West and Rocky Mountains last week abruptly interrupted the revival of motor fuel movement which prevailed for the last two weeks in March and for five days of April. Snowfall, which set 1937-38 winter records in several parts of the country was accompanied by subfreezing and near-freezing temperatures. Icy, snow-covered highways impeded use of automobiles and trucks inflicting an immediate pressure on the gasoline trend which had started the spring upswing in both volume and prices. A temporary stimulant was administered to the domestic fuel oil market as many customers were compelled to replenish their stand-by stocks, but there was no real life imparted since, at best, sellers realized conditions could prevail for only a few days.

In several markets the slight gains realized in motor fuel movement and prices following two weeks of favorable driving weather had been relinquished. Tankcar gasoline prices in New York remained unchanged at 6¼ to 6½ cents per gallon for "regular" quality, but barge deliveries were reported made at 6 cents and some sellers were said to be offering material at 5⅞ cents. There were reports current that a few suppliers were offering to make barge deliveries over an extended period at 6 to 6¼ cents.

Chief hope for an early improvement in the Gulf Coast gasoline market rests on absorption of available stocks in Rumania. At least one and possibly two cargoes of gasoline were shipped from Rumania to western European ports in the latter part of March on a basis of 4¾ cents Gulf Coast. American traders have learned from experience that it is useless to compete with Rumania if that country has an exportable supply on hand.

Export gasoline of 64, 375 e.p. grade can be obtained at 4⅞ cents per gallon. Some suppliers may be willing to deliver motor fuel with a slightly higher octane number for the same figures.

Since the Rumanian cargo was placed, inquiries have picked up somewhat in the Gulf Coast, but no cargoes of motor fuel for export were reported sold in the open market last week. Most of the current interest along the Gulf Coast centers on gas oil. Quotations range from 3⅝ to 4 cents per gallon, depending on the diesel index. One trader reported he had been offered gas oil with a low diesel index at 3½ cents, but no business at that figure had been transacted at the end of the week.

Domestic motor fuel is available on the Gulf Coast for coastwise movement at 5 to 5⅝ cents per gallon. With the tanker charter rate clinging to the season's low level, it is possible to deliver motor fuel at North Atlantic ports at a range of around 5⅝ to 6 cents per gallon, explaining the status of the barge market in New York and vicinity.

The advances of a half cent per gallon in tankcar and tank-wagon prices by Socony-Vacuum Oil Co., Inc., in practically all New England states, excepting Connecticut, appear to be reasonably well established. Most other sellers in the territory raised their quotations by equal margin and dealers in most instances relayed the higher price to consumers. The advance was predicated on disappearance of snow in that area after several months of unfavorable driving weather and the prospects that New England will obtain a record volume of tourist travel this year. There was still considerable material moving into the Boston district at prices permitting shading of the higher tankcar and tank-wagon quotations, but in these instances most of the retail dealers were taking advantage of the greater margin offered. Heavy fuel oil remains stagnant in all markets. Bunker C material is reported available on the Gulf Coast as low as 70 cents, but most of the sellers are quoting 75 to the few inquiries reaching that section. Due to the drift into lower ground at Gulf Coast terminals and the persistent low level of tanker rates, North Atlantic suppliers cut Bunker C fuel oil prices at all delivery points. The New York, Baltimore and Norfolk Bunker C fuel oil markets are now quoted at $1.05 per barrel, off 10 cents from the prices prevailing at the start of April. Reductions of 10 cents per barrel were made at other points up and down the Atlantic Coast including Boston and Philadelphia. The New Orleans price was lowered to 85 cents per barrel.

Despite the break in the general market, Bunker C fuel oil was still available in New York harbor at 95 cents to $1, although the supply available at these figures was limited. Deliveries to practically all classes of consumers of heavy fuel oil are on the curtailed basis prevailing in December, January, February and March. There was a gain of 16 per cent in factory sales of automobiles in March, according to the Automobile Manufacturers' Association, which if continued and extended in April and May will have beneficial effect on the heavy fuel-oil consumption.

Colder weather and the moisture precipitated in the form of snow will further delay spring tractor operation in the agricultural districts, holding kerosene shipments in those directions at low levels. There were no changes in the kerosene market from the preceding week's quotations in the large centers of production. On the Gulf Coast, kerosene quotations range from 4½ to 4⅝ cents.

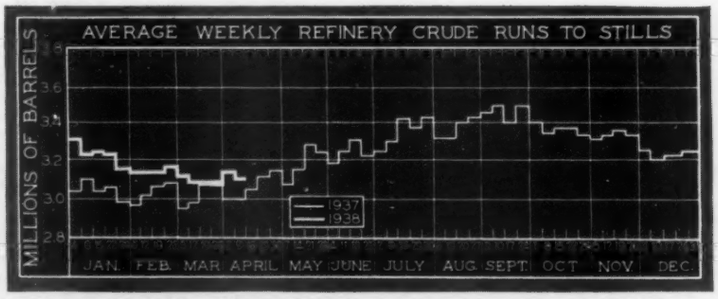
Lubricating oil traffic in western Pennsylvania was limited to shipments against contracts with an occasional inter-refinery sale. Prices on all grades of lubricants are unchanged. Shipping instructions are expected to pick up considerably as soon as a longer period of summer weather is forthcoming. The winter oil changeover campaigns are just now getting under full headway.

A. P. I. Weekly Refinery Statistics

Week Ending April 9, 1938

	Capacity reporting (per cent)	Daily crude runs (bbls.)	Total gasoline stocks	Gas oil and fuel oil stocks
East Coast	100.0	516,000	23,400,000	9,615,000
Appalachian	88.4	99,000	3,464,000	1,295,000
Indiana, Illinois, and Kentucky	92.4	396,000	15,278,000	7,261,000
Oklahoma, Kansas, and Missouri	84.7	265,000	7,804,000	3,462,000
Inland Texas	56.6	134,000	2,777,000	1,642,000
Texas Gulf	95.7	710,000	13,276,000	8,433,000
Louisiana Gulf	96.6	123,000	2,609,000	3,069,000
North Louisiana and Arkansas	63.7	45,000	532,000	536,000
Rocky Mountains	69.7	33,000	2,265,000	794,000
California	90.9	511,000	15,914,000	86,553,000
Total reported	89.0	2,832,000	87,319,000	122,660,000
Estimated unreported	.....	278,000	4,960,000	2,530,000
*Estimated total	.....	3,110,000	92,279,000	125,190,000
*Estimated total previous week	.....	3,145,000	92,924,000	123,621,000
*April 10, 1937	.....	3,005,000	82,579,000	94,581,000

*Bureau of Mines, currently estimated.



Stocks of Crude Oil in the United States

(BUREAU OF MINES ESTIMATES)

Week ending April 2, 1938	308,237,000 barrels
Week ending March 26, 1938	307,557,000 barrels
Week ending April 3, 1937	298,163,000 barrels

Taxes Economic Sedative

Excessive taxation of business acts as an economic sedative, Baird H. Markham, director of the American petroleum industries committee, asserted in an address April 11 before the fifteenth annual meeting of the Oil Burner Institute. He urged that business men "study a situation whereby more and more of the citizens' income goes to pay taxes, and less and less is left with which to buy necessities."

"It may be that you, as business men, feel that you have no direct interest in these matters. You, like other business men, are busy people. You have little or no time for the theories, or the responsibilities, of government," said Mr. Markham. "I regret to express the opinion that if you intend to remain in business, you will have to find time—time to study trends in taxation and legislation; time to act upon them. Business men must take an interest in these matters because there has been, and is, a definitely observable trend towards shifting the incidence of taxation to business. There are 182,651 taxing jurisdictions in this country, each of which is authorized to impose and to collect its own taxes."

Retail Oil Markets

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of April 12, 1938

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline is the regular or standard grade. In most areas a third grade and a premium grade are also available.

Standard Oil Co. (Indiana)

	Gasoline Tank wag.	Gasoline Dlr.	Gasoline Inc. tax	Kero. tank wag.
Chicago, Ill.	15 6	13.6	4 0	10.5
Decatur	15.6	14.1	4 0	10.5
Joliet	15 6	14.1	4 0	10.5
Peoria	15 6	14.1	4.0	10.5
Quincy	15 4	13.9	4 0	10.3
Davenport, Ia.	15.6	14.1	4.0	‡10.5
Des Moines	15 4	13.9	4 0	‡8.3
Mason City	15 8	14 3	4 0	‡10.7
Sioux City	15 6	14 1	4 0	‡10 5
Duluth, Minn.	17.4	15.9	5 0	11 3
Mankato	17 0	15 5	5 0	10 9
Minneapolis	17 0	15.5	5 0	10 9
LaCrosse, Wis.	17 0	15 5	5 0	10 9
Green Bay	17.4	15 9	5 0	10.3
Milwaukee	16 8	15.3	5.0	10.7
Detroit, Mich.	15 3	13 8	4 0	10.0
Grand Rapids	16.5	13.3	4.0	9.7
Saginaw	16 3	14 8	4 0	9 3
Evansville, Ind.	17.1	15 6	5 0	†11.0
Indianapolis	17 3	15 8	5 0	†11 2
South Bend	17 6	16.1	5 0	†9.4
Fargo, N. Dak.	17.2	15 7	4 0	12.1
Minot	18 5	17.0	4 0	13.4
Huron, S. Dak.	17 5	16.0	5 0	11.4
Kans. City, Mo.*	14 9	13 4	4 0	9 8
St. Louis*	15 2	13 7	4.0	10.1
St. Joseph*	14 9	13 4	4 0	9 8
Wichita, Kans.	14.4	12 9	4.0	8.3

*State tax 2 cents, 1-cent city tax and 1-cent federal tax. †Does not include 4-cent state tax. ‡Does not include 3-cent state tax.

Exclusive of state general sales taxes.

Discounts to commercial consumers: On purchases per month off tank-wagon prices: 1,000 gallons or more, 1.5 cents off; minimum delivery 25 gallons.

Stanolax Fuel Oil in Chicago

Effective Dec. 7, 1936, f.o.b. Chicago tank-wagon prices: Range oil, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7.3 cents. Stanolax No. 1, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7 cents. Stanolax furnace oil, 1-149 gallons, 7.8 cents; 150 gallons and over 7 cents; Stanolax A, 1-399 gallons, 5.75 cents; 400 gallons and over, 4.75 cents. Stanolax B, 1-799 gallons, 5.75 cents; 800 gallons and over, 4.75 cents.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline Tank-wag. dlr.	Gasoline Tank-car con'r.	Gasoline Inc. tax	Kero. tank wag.
Atl'tic. City, N. J.	12 75	11.25	4 0	8 5
Newark	12.75	11.25	4.0	8.0
Annapolis, Md.	14 85	13 35	5.0	9 5
Baltimore	14.25	12.75	5.0	9 0
Cumberland	16 65	14.15	5 0	10 0
Wash'g'n, D. C.	12 5	11 0	3 0	9 5
Danville, Va.	16.95	14.45	6.0	12.9
Norfolk	15.75	13.25	6.0	11.5
Petersburg	16 05	13.55	6.0	11.7
Richmond	16.05	13.55	6.0	11.7
Roanoke	17.25	14.75	6.0	12.9
Charles'n, W. V.	17 05	14.55	6 0	12 6
Parkersburg	15 35	13 85	6 0	11 2
Wheeling	16 25	14 85	6 0	12 2
Charlotte, N. C.	18 65	16 15	7 0	12 6
Hickory	19 15	16 65	7 0	13.0
Mt. Airy	18 95	16 45	7 0	12 8
Raleigh	18 25	15 75	7 0	12 1
Salisbury	18 75	16 25	7 0	12 7
Charleston, S. C.	17 25	14 75	7 0	11 1
Columbia	18 25	15 75	7 0	12 1
Spartanburg	18 95	16 45	7 0	12 9

Price basis to commercial consumers, effective March 8, 1937, in Maryland, District of Columbia, and in Arlington and Fairfax counties in Virginia; and March 12 in New Jersey: To contract accounts purchasing at least one full compartment at time by hose connection, on yearly purchases: From 2,500 to 100,000 gallons, consumer tank-wagon price at time and place of delivery; 100,000 gallons per year, consumer tankcar price plus .5 cent per gallon. Consumer tank-wagon price generally will be equivalent to dealer tank-wagon price less .5 cent per gallon.

Effective May 15, 1937, in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax counties); Commercial consumers taking deliveries of 50 gallons (W. Va., 100 gallons) or more at one time will be billed at posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons (W. Va., 100 gallons) will be billed at 4 cents per gallon over posted consumer tank-wagon price. Generally the posted consumer tank-wagon price will be the equivalent to the dealer price less .5 cent per gallon.

Discount for kerosene, 1 cent off tank-wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except no discount in New Jersey.

Southern District

STANDARD OIL CO. OF KENTUCKY

	Gasoline Tank-wag.	Gasoline Net dlr.	Gasoline Inc. tax	Kero. tank wag.
Atlanta, Ga.	21 0	18 0	7 0*	†14 0
Augusta	21 0	18 0	7 0	*14 0
Macon	21 0	18 0	7 0	*14 0
Savannah	19 5	16 5	7 0	*12 0
Birm'ham, Ala.	21.0	18 0	8.0	12.0
Mobile	21.0	18 0	9.0	†11.0
Montgomery	22 0	19 0	9 0	†13 0
Jackson, Miss.	19.5	16.5	7.0	*13.0
Vicksburg	19.5	16.5	7.0	*13.0
Jacks'ville, Fla.	22 5	17 5	8 0	†11.0
Miami	20 5	17 5	8 0	†12.5
Pensacola	22 0	19 0	9 0	12 0
Tampa	20 5	17 5	8 0	10 5
Lexington, Ky.	19.0	16.0	6.0	11.0
Covington	18 5	15 5	6 0	11 0
Louisville	19 0	16 0	6 0	10 5
Paducah	17.0	14 0	6 0	10.0

Price basis to tank-wagon consumers: Effective January 4, 1937, 3 cents per gallon below tank-wagon price. Kerosene prices in all states subject to 2 cents discount except in Kentucky where prices are net.

*Includes 1-cent state tax. †Subject to 2-cent discount.

Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax; and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon; Pensacola has a city gasoline tax of 1 cent.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline Dealer	Gasoline Inc. tax	Kero. tank wag.
Denver, Colo.	14.0	5.0	11.5
Grand Junction	19 0	5 0	15 0
Pueblo	13.0	5.0	10.5
Casper, Wyo.	17 0	5 0	11 5
Cheyenne	16 0	5 0	13 0
Butte, Mont.	19 5	6 0	15 5
Billings	19 5	6 0	15 5
Helena	19 5	6 0	15 5
Great Falls	19 5	6 0	15 5
Salt Lake City, Utah	19 5	5 0	16 0
Twin Falls, Ida.	21 0	6 0	18 0
Boise	21 5	6 0	18 0
Albuquerque, N. M.	17 5	*6 5	12 0

*Includes city tax of one-half cent.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline Tank-wag.	Gasoline Di-vided con'r. dlr.	Gasoline Inc. tax	Kero. tank wag.
Ohio points	16.5	15.5	5 0	*13.0

*Includes state tax of 1 cent.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline Tank-wag.	Gasoline Tank-car	Gasoline Inc. tax	Kero. tank wag.
Albany, N. Y.	14 5	12 5	5 0	9 0
*Met. N. Y.-				
M'nh't'n, Br'nx	14 0	12 5	5 0	8 75
Staten Island	14 0	12 5	5 0	8 75
Q'ns. & Bklyn.	14 0	12 5	5 0	8 75
Buffalo	14 0	13 0	5 0	7 5
Rochester	15 0	13 2	5 0	8 5
Syracuse	14 5	13 1	5 0	9 0
Boston, Mass.	13 5	11 75	4 0	8 5
Portland, Me.	15 0	13 0	5 0	8 75
Manch'ter, N.H.	15 5	....	5 0	9 0
Burlington, Vt.	15.4	13.4	5 0	9.5

*Does not include 2 per cent city sales tax which is calculated on basis of net retail price exclusive of state and federal taxes. Metropolitan New York prices are undivided dealer prices; others are split dealer.

Price basis to undivided dealer: Posted dealer tank-wagon price less .5 cent. Price basis to commercial consumer: Effective Nov. 15, 1936, monthly purchases of 25,000 gallons and over, consumer tankcar prices at delivery point plus .5 cent per gallon; monthly purchases of 5,000 to 25,000 gallons, undivided dealer price at delivery point; monthly purchases under 5,000 gallons, pay divided dealer tank-wagon prices at delivery point.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline Tank-wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
San Francisco	17 5	18 5	4 0	11.5
Los Angeles	17 0	18 0	4 0	10 0
Fresno, Calif.	18 5	19 5	4 0	12 5
Phoenix, Ariz.	21 0	22 0	6 0	*17 0
Reno, Nev.	20 0	21 0	5 0	13 0
Portland, Ore.	20 0	21 0	6 0	13 5
Seattle, Wash.	20 0	21 0	6 0	13 5
Spokane	22 5	23 5	6 0	16 0
Tacoma	20 0	21.0	6 0	13 5

*Includes 5-cent state tax.

Discounts to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents; to split dealers, 2 cents. To commercial consumers: on tank-wagon price: on single deliveries of 40 gallons and over, advance quantity discount extended at time of delivery, 3 cents. Service station schedule applies on single deliveries less than 40 gallons. On kerosene in tankcar, transport truck and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank-wagon.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline Tank wag.	Gasoline Drl.	Gasoline Inc. tax	Kero. tank wag.
Omaha	18 0	16 5	6 0	10 8
McCook	17 8	15 3	6 0	10 3
Norfolk	18 4	16 9	6 0	10 3
North Platte	18 8	16 9	6 0	11.2
Scotts Bluff	19 5	16 3	6 0	12 3

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective Jan. 1, 1935.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline Tank-wag. dlr.	Gasoline Tank-car con'r.	Gasoline Inc. tax	Kero. tank wag.
N. Orleans, La.	19 0	16 5	*10 0	†12 0
Baton Rouge	17 0	14 5	8.0	12.0
Alexandria	17 5	15.0	8.0	10.5
Lafayette	18 0	15.5	8.0	12.5
Lake Charles	18 0	15 5	8 0	12.5
Shreveport	16 5	14 0	8.0	9.5
Kn'ville, Tenn.	20 0	17 5	8 0	14.0
Memphis	18 0	15 5	8.0	12.0
Chattanooga	19 5	17 0	8 0	13.5
Nashville	19 0	16 5	8 0	10 5
Bristol	19.0	17.75	8 0	14.5

*Includes 2-cent parish tax. †Includes 1-cent parish tax and 1-cent state tax.

Price basis to commercial consumers: Effective May 15, 1937, deliveries of 50 gallons or more in one delivery takes posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons at one time pay posted consumer tank-wagon price plus 4 cents per gallon. Generally, the posted consumer tank-wagon price will be equivalent to the dealer price less .5 cent per gallon.

Louisiana kerosene prices include 1-cent state tax.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline Tank-wag. dlr.	Gasoline Tank-car con'r.	Gasoline Inc. tax	Kero. tank wag.
Philadelphia, Pa.	13 75	12 25	5 0	10 0
Pittsburgh	15 0	13 0	5 0	10 5
Allentown	14 25	12.75	5.0	10.5
Erie	14 5	13 0	5 0	10 0
Scranton	14 5	13 0	5 0	10 5
Altoona	15 0	13.0	5 0	10.5
Dover, Del.	14 0	....	5 0	10 5
Wilmington	14 0	....	5.0	10 5
Springf'd, Mass.	14 0	....	4 0	8.0
Worcester	14 5	....	4 0	9.0
Hartford, Conn.	13.6	....	4.0	8.0
New Haven	13.5	....	4 0	8 0
Providence, R. I.	13.3	....	4 0	8.5

Price basis to undivided dealers, dealer tank-wagon price less .5 cent per gallon. Price basis to commercial consumers in Pennsylvania and Delaware, effective March 11, 1937: Consumers under contract using 100,000 gallons or more per year full compartment hose deliveries, tankcar plus .5 cent. Consumers under contract using less than 100,000 gallons per year compartment hose deliveries, undivided dealer price. Consumers under contract less than full compartment delivery, consumers not under contract, less than full compartment delivery, and consumers not under contract full compartment delivery, divided dealer price. Less than 25 gallons, tank-wagon delivery, 4 cents per gallon above undivided dealer price.

Oklahoma and Arkansas

CONTINENTAL OIL CO.

	Gasoline Dealer	Gasoline Inc. tax	Kero. tank-wag.
Muskogee, Okla.	14 5	5 0	7.0
Oklahoma City	14 0	5 0	8 0
Tulsa	14 0	5 0	6.0
Ft. Smith, Ark.	14 25	5 0	8 0
Little Rock	17 25	7 5	9.5
Texarkana	14 0	5 0	8.5

Texas

	Gasoline Tank-wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank-wag.
Dallas, Tex.	14 0	18 0	5 0	8.0
Fort Worth	14 0	18 0	5 0	8.0
Houston	14 5	19 0	5 0	8 0
San Antonio	13 5	17 5	5 0	8 0

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank-wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16 0
Cleaners' naphtha	15 0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax or 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150-gallon lots if covered by contract.

Canada*

3-Star Imperial Gasoline
IMPERIAL OIL, LTD.

	Tank-wag.	Inc. tax	Kero. tank wag.
Halifax, N. S.	24 5	10 0	18 5
St. John, N. B.	24 5	10 0	18 5
Montreal, Que	21 0	6 0	17 5
Toronto, Ont.	22 0	6 0	17 0
Hamilton, Ont.	22 0	6 0	17 0
Winnipeg, Man.	27 5	7 0	20.7
Brandon, Man.	28 1	7 0	22.3
Regina, Sask.	27 0	7 0	22 0
Saskatoon, Sask.	29 8	7 0	24 9
Edmonton, Alta.	26 5	7 0	21 5
Calgary, Alta.	24 0	7 0	19 0
Vancouver, B. C.	23 0	7 0	23 0

*Imperial gallon used in Canada.

Divided dealers pay tank-wagon price. Discount to undivided dealers, 1 cent below tank-wagon price. In maritime provinces both divided and undivided dealers pay tank-wagon price.

Retail Price Changes

Standard Oil Co. (Indiana) March 28 reduced tank-wagon kerosene 1.5 cents at Grand Rapids.

Standard Oil Co. of New Jersey April 5 reduced tank-wagon kerosene .5 cent at Newark.

Socony-Vacuum Oil Co., Inc., March 30 advanced tankcar and tank-wagon gasoline prices .5 cent in Boston, Portland, Manchester and Burlington.

Standard Oil Co. of Nebraska April 4 advanced dealer gasoline 1.5 cents in North Platte.

Atlantic Refining Co. March 28 reduced tank-wagon kerosene .5 cent at all Pennsylvania points, except Erie, and all Delaware points; March 31 advanced dealer gasoline .5 cent in Springfield and Worcester; March 16 reduced tank-wagon kerosene .5 cent at Springfield.

A.P.I.-A.S.M.E. Code

The joint A.P.I.-A.S.M.E. committee on unfired pressure vessels, Walter Samans, Atlantic Refining Co., Philadelphia, Pa., chairman, recently submitted the third edition, 1938, of the A.P.I.-A.S.M.E. Code for Unfired Pressure Vessels to the associations, and it has been accepted and published in the usual form. Copies may be secured from either American Petroleum Institute, 50 West Fiftieth Street, or the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York City.

Prices of Refined Products

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of April 12, 1938

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
62 oct. and below	.04⅜	.04½
63-66 octane	.04⅝	.04¾
67-69 octane	.04⅞	.05
70-72 octane (regular)	.05¼	.05⅜
60-62 400 grades:		
62 oct. and below	.04⅜	.04½
63-66 octane	.04⅝	.04¾
67-69 octane	.04⅞	.05
70-72 octane (regular)	.05¼	.05⅜
64-66 375	.04¾	.04⅞
68-70 360	.05	.05⅛

NORTH TEXAS—

U. S. Motor grades:		
62 octane and below	.04⅜	.04½
63-66 octane	.04⅝	.04¾
67-69 octane	.04⅞	.05
70-72 octane (regular)	.05¼	.05⅜
60-62 400	.04⅜	.04½
64-66 375	.04¾	.04⅞

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)

U. S. Motor grades:		
62 octane and below	.04¼	.04½
63-66 octane	.04⅝	.04⅞
67-69 octane	.04⅞	.05
70-72 octane (regular)	.05⅜	.05½

ARKANSAS (Ark., N. La., Miss. del.)—

U. S. Motor grades:		
62 octane and below	.04⅜	.04½
67-69 octane	.04⅞	.05
70-72 octane (regular)	.05½	.05⅝

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
62 octane and below	.04⅜	.04⅝
63-66 octane	.04⅝	.04⅞
67-69 octane	.04⅞	.05⅛
70-72 octane (regular)	.05¼	.05½
60-62 400 grades:		
62 octane and below	.04⅜	.04⅝
63-66 octane	.04⅝	.04⅞
67-69 octane	.04⅞	.05⅛
70-72 octane (regular)	.05¼	.05½
64-66 375	.04¾	.05
68-70 360	.05	.05¼

PENNSYLVANIA (Inland refineries)—

58-60 U. S. Motor:		
Below 60 octane	.05	.05⅛
65 octane	.06¼	.06½
68-70 octane	.06⅞	.07⅛

CALIFORNIA (domestic movement)—

54-58 U. S. Motor	.06¾	.08¼
58-60 400, 65 oct. and higher	.08½	.09¼

EAST COAST (Domestic)—

U. S. Motor, 60-64.9 octane:		
New York (Bayonne)	.06¼	.06½
Philadelphia	.06¼	.06½
Boston	.06½	.06¾
Baltimore	.06½	.06¾
Charleston, S. C.	.07	.07¼
U. S. Motor, 65 and above:		
*New York (Bayonne)	.06½	.07
Philadelphia	.06½	.07
Boston	.06¾	.07
Baltimore	.07	.07¼
Charleston, S. C.	.07¼	.07½

*All grades of gasoline one-eighth to one-fourth cent less for barge shipments. New York harbor prices are for New York and New England delivery. Prices for New Jersey delivery one-fourth cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
Below 60 octane	.05	.05¼
60-64.9	.05¼	.05⅝
65 octane and higher	.05½	.05¾

Naphtha

PENNSYLVANIA (Inland refineries)—

52-56 450 (blending)	.04¾	.05

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70		.02½
Grade 18-55	.03	.03¼

NORTH TEXAS—

Grade 26-70		.02⅝
Grade 18-55	.03⅛	.03¼

CALIFORNIA—

75-85 375-390	.06½	.07

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

Grade 26-70		.03

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 l.b.p., 110 flash, 540-550 e.p.	.04⅛	.04¼
41-43 gr., 300-520 l.b.p., 110-125 flash, 500-520 e.p.	.04¼	.04⅜
46-48 gr., 210-230 l.b.p., 480 max. e.p.	.04⅝	.04¾

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

41-43	.04⅛	.04⅜
42-44	.04⅜	.04½

NORTH TEXAS—

41-43	.04⅛	.04⅜

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

41-43	.04⅜	.04½

ARKANSAS (Ark., N. La., Miss. del.)—

41-43	.04½	.04⅝

PENNSYLVANIA (Inland refineries)—

45	.05	.05⅛
46	.05⅛	.05¼
47	.05¼	.05⅝

CHICAGO (Based on Group 3)—

41-43	.04⅛	.04⅜
42-44	.04⅜	.04⅝

CALIFORNIA (Pac. Coast market)—

38-43 high burning test	.05¼	.06½

NEW YORK (Bayonne, N. J.)—

41-43		.05¾

***GULF COAST (domestic)—**

41-43	.04⅝	.04¾

*Barge price one-eighth cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

Range oil	.04	.04⅛
No. 1 prime white, 38-42	.03⅞	.04
No. 1 straw, 38-40	.03¾	.03⅞
No. 2 straw, 32-36	.03½	.03⅝
No. 2 dark, 32-36	.03⅜	.03½
No. 3 zero to 15, 28-32		.03⅜
No. 3, 15 and above, 28-32	.03	.03⅛

NORTH TEXAS—

No. 1 prime white, 38-42	.03⅞	.04
No. 1 straw, 38-40	.03¾	.03⅞

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

No. 2, 32-36	.03½	.03⅝

ARKANSAS (Ark., N. La., Miss. del.)—

No. 2, 32-36		.03¾

CHICAGO (Based on Group 3)—

Range oil	.04	.04⅛
No. 1 prime white, 38-40	.03⅞	.04⅛
No. 1 straw, 38-40	.03¾	.03⅞
No. 2 straw, 32-36	.03⅝	.03¾
No. 2 dark, 32-36	.03⅜	.03⅝
No. 3, zero to 15, 28-32	.03⅜	.03½
No. 3, 15 and above, 28-32	.03	.03⅛

NEW YORK (Bayonne, N. J.)—

*No. 1		.05¾
*No. 2		.04¾
*No. 4		.04¾

*Barge deliveries one-eighth to one-fourth cent under above tankcar price.

Gas Oil and Fuel Oil

(Gas oil per gal.; fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil	.02⅝	.02⅞
No. 4, low cold test, 24-28	1.10	1.15
No. 4, 15 and above, 24-28	.90	.95
No. 5, low cold test, 18-22	.72½	.77½
Below 18 fuel oil, industrial	.55	.60

NORTH TEXAS—

U.G.I. gas oil	.02⅝	.02¾
No. 4, low cold test, 24-28	1.10	1.15
No. 5, low cold test, 18-22	.72½	.77½
Below 18 fuel oil, industrial	.55	.60

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

10-14 fuel oil, industrial	.80	.85

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.02⅝	.02⅞
No. 4, low cold test, 24-28	1.10	1.15
No. 4, 15 and above, 24-28	.90	.95
No. 5, low cold test, 18-22	.72½	.80
No. 5, 15 and above, 18-22	.60	.70
No. 6, low cold test, 10-16	.60	.70
No. 6, 15 and above, 10-16	.40	.50

PENNSYLVANIA (Inland refineries)—

36-40	.04	.04⅜

CALIFORNIA

Los Angeles:		
30-40 gas oil, per bbl.	1.30	1.50
24 plus diesel, per bbl.	1.30	1.50
24 plus diesel (bunkers)	1.35	1.55
12-16 (bunkers at tidewater)	.90	1.00
10-16 (cargo lots)	.80	1.00
12-17 (tankcars)	.70	1.00
10-17 (high sulfur)	.60	.95
San Joaquin Valley:		
10-18 tankcars)	.60	.85
24 plus diesel, per bbl.	1.30	1.50
San Francisco:		
24 plus diesel, per bbl.	1.45	1.55
24 plus diesel (bunkers)	1.55	1.65
10-16 (bunkers)	1.00	1.05

GULF COAST—

28-30 gas oil		.03⅝
28-30 diesel (bunkers)		1.75
Bunkers (bulk cargoes)		.75
Bunker C (bunkers)		.85

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.04¾
28-30 diesel (lighterage 6¼c per bbl.)		1.85
28-30 diesel (tankcars)	.04¾	.05
Bunker C (to ocean-going ships in N. Y. harbor)		1.10
Industrial fuel (tankcars)	.04	.04¼

Lighterage charge 5c bbl. additional.

Bright and Steam Refined

OKLAHOMA (Group 3)—

Bright Stocks:		
190-200 D, 15-25		.19
150-160 D, 0-10		.16
150-160 D, 15-25		.15
150-160 E, 15-25		.14½
100-110 D, 0-10		.14½
Steam refined:		
631 green (treated)		.13½
600 dark green (untreated)		.05

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour test	.17½	.18½
15 pour test	.16½	.17½
20 pour test	.15½	.16½
25 pour test	.14½	.15½
Steam refined:		
600	.08½	.09
650	.10½	.11⅛
600 Pennsylvania flash	.11	.13
630 flash	.14	.15
600 Warren E filtered	.13	.14

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

Zero to 10 Cold Test:		
150-3		.09
180-3		.10
180-4		.09½
200-3		.10½
200-4		.10
250-3		.11½
250-4		.11
280-3		.12½
280-4		.12
300-3½		.13
400-3½		.14
100-2½ paraffin oil		.06
15-20 Cold Test:		
200-3		.10
200-4		.09½
250-3		.11
250-4		.11½
280-3		.12
280-4		.11½

GULF COAST—

Pale Oils:		
200-3	.07	.07¼
300-3	.07½	.07¾
500-3½	.08½	.08¾
750-3½	.08⅝	.09¼
1,200-3½	.09½	.09¾
1,500-4	.09¾	.10
Red Oils:		
200-5-6	.07¼	.07½
300-5-6	.07¼	.07½
500-5-6	.08	.08½
750	.08¾	.09
1,200-5-6	.09¼	.09½

CALIFORNIA (moving to dom. market)—

Pale Oils:		
100-2½-3	.07¼	.08
200-2½-3	.07¼	.08
300-2½-3	.07¼	.08
400-3-4	.07¼	.08
450-3-4	.07¼	.08
550-3-4	.09	.11
600-3-4	.09	.11
Red Oils:		
200-4-5	.07¼	.08
300-5-6	.07¼	.08
350-5-6	.09¼	.11½
400-5-6	.09¼	.11½
450-5-6	.09¼	.11½
500-5-6	.09¼	.11½
600-5-6½	.09¼	.11½
700-6½ plus	.09¼	.11½
750-6½ plus	.09¼	.11½
900-6½ plus	.09¼	.11½

PENNSYLVANIA—

150 vis. at 70° F. color, 400-405 flash:		
Zero pour test	.16½	.17
10 pour test	.15½	.16
15 pour test	.15	.15½
180 vis. at 70° F., 3 color:		
25 pour test	.15	.15½
200 vis. at 70° F., 3 color:		
Zero pour test	.19½	.20
10 pour test	.18½	.19
15 pour test	.18	.18½
25 pour test	.16	.16½

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (a.m.p.) w.c. scale	.02⅛	.02¼

PENNSYLVANIA (Inland refineries)—

122-124 (a.m.p.) w.c. scale	.0190	.0200
124-126 (a.m.p.) w.c. scale	.0190	.0200

NEW YORK—

Wax in bags fully refined:		
122-125 (a.m.p.) wax		.0420
125-127 (a.m.p.) wax		.0435
128-130 (a.m.p.) wax		.0445
130-132 (a.m.p.) wax		.0455
133-135 (a.m.p.) wax		.0500
135-137 (a.m.p.) wax		.0515
124-126 (a.m.p.)) w.s.	.0205	.0215
124-126 (a.m.p.) y.s.	.0200	.0210
Petrolatum in barrels, carload lots:		
Dark green	.02	.02⅛
Amber	.02⅜	.02½
Extra amber	.02⅝	.02¾
Lily white	.05⅛	.05¼
Snow white	.06⅛	.06¼
Cream	.04⅛	.04¼

Export Prices

GASOLINE

GULF COAST—

U. S. Motor	.04¾	.04⅞
60-62 400	.04¾	.04⅞
61-63 390	.04⅞	.05
64-66 375	.04⅞	.05

LOS ANGELES—

U. S. Motor grades:		
55-65 octane	.05¼	.05½
65-69 octane		.05¾
Above 69 octane		.06¼

KEROSENE

GULF COAST—

41-43 prime white	.04⅝	.04⅝
41-43 water white	.04½	.04¾
44 water white		.04¾

LOS ANGELES—

41-43 water white	.05	.05¼

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.o.a. in bbls.)—

Cylinder Stocks:		
600 Warren E	.20½	.21
600 S.R. unfiltered	.16	.16½
630 S.R. unfiltered	.18	.18½
600 flash S.R.	.18½	.19
630 flash, S.R.	.21½	.22
Bright Stocks:		
8 color	.23	.23½
6½ plus color in dilution	.22½	.23

NEUTRAL OIL

200-3 color	.24½	.25
150-3 color	.22½	.23

PARAFFIN WAX

NEW YORK (prices per pound)—

123-126 a.m.p.		.0375
125-127 a.m.p.		.0387
128-130 a.m.p.		.0412
133-135 a.m.p.		.0437
135-137 a.m.p.		.0455
Crude Scale:		
124-126 w.s.	.0205	.0215
124-126 y.s.	.0200	.0210

Crude Oil Prices

Oklahoma, Kansas, North Central and East Central Texas

(Effective January 28, 1937)

East Texas (May 22, 1937)*	$1.35
Van, Tex.†	1.10
Camp Hill, Tex.	1.27
Cass County, Tex.‡	1.25
Talco	.73
Altus and Tipton, Okla.§	1.20
Other fields (see gravity table).	

*All companies. †Humble Oil & Refining Co.; Pure Oil Co. ‡Texas Co. §Gulf Oil Co. Talco by Humble Oil & Refining Co.

North Louisiana and Arkansas

Smackover, all grades	$ .90
Tullos and Urania	1.02
El Dorado East field	.90
Union County, Ark.	.90
Ouachita County, Ark.	.90
Lisbon, La. (Dec. 13, 1937)*	.98

*Caddo Crude Oil Purchasing Co.

Gulf Coast

(Effective January 28, 1937)

Choctaw and Darrow, La. See note below	
Clay Creek, Tex.	$1.00
Garden Island, La.	1.37
Cleveland, Tex.	1.27
Hardin, Tex.	1.15
Lafitte, La.	1.24
Livingston, Tex.	1.27
Welsh, La.	.98
Tepetate (La.) (Jan. 28, 1937)	1.24

Duval, Jim Hogg, Webb and Zapata counties, Texas, and Heyser and Placedo fields take Mirando gravity prices. Jennings, La., 5 cents lower than Gulf Coast prices on each degree. Segno, Texas, takes Gulf Refining Co.'s Gulf Coast prices. Choctaw and Darrow, Louisiana, posted for first time by Standard Oil Co. of Louisiana, start below 21 degrees at 90 cents, with 3-cent differential up to 25 gravity, then 2-cent differential up to 40 and above, $1.36. Effective October 1, 1937, Stanolind Oil & Gas Co. in Evangeline, La., pays 92 cents for below 20 gravity, adding 2 cents for each degree upward to 40 and over, at $1.34.

Rocky Mountain States

(Effective January 28, 1937)

Iles, Colo., light*	$1.18
Iles, Colo., heavy*	1.12
Greybull, Wyo.*	1.30
Torchlight, Wyo.*	1.30
Grass Creek, Wyo., light*†	1.30
Grass Creek, Wyo., heavy (Nov. 4, 1936)*†	.62
Hamilton Dome, Wyo., (Jan. 1, 1937)*	.67
Elk Basin, Wyo., light*†	1.30
Frannie, Wyo., heavy*	.62
Frannie, Wyo., light	.70
Hogback, N. M. (Jan. 28, 1937)*	1.33
Salt Creek, Dutton Creek and Midway, Wyo., take Stanolind's Oklahoma prices on a gravity basis.	
Big Muddy, Wyo.†‡	1.23
Rock Creek, Wyo.†	1.20½
Lea County, N. M. (see West Texas gravity table).	
Artesia, N. M. (Jan. 2, 1937)‡	.90
Maljamar, N. M. (Jan. 28,1937)‡	.90
Canon City and Florence, Colo.	1.10
Lance Creek, Wyo.	.97
Lander, Wyo. (Jan. 1, 1938)§	.51¼
Sunburst, Mont. (Nov. 16, 1937)†	.90
Cat Creek, Mont. (Jan. 1, 1938)‡	$1.30
Garland, Wyo. (Jan. 1, 1937)†	.50

*Stanolind Oil & Gas Co. †Ohio Oil Co. ‡Continental Oil Co. Texas Co. (April 1, 1938). §Hudson Oil Co.

Middle Western States

OHIO OIL CO.
(Effective January 28, 1937)

Lima	$1.00
Illinois	1.35
Princeton, Ind.	1.35
Midland, Mich. (Jan. 5, 1938)*	1.12
West Branch, Mich. (Dec. 29, 1937)†	.80
Buckeye (Jan. 8, 1938)	1.09¼
Arenac, Mich. (Dec. 29, 1937)†	.80
Muskegon, Mich.	1.00
Eastern Kentucky:	
Big Sandy River	1.42
Kentucky River	1.50
Western Kentucky	1.40

*Posted by Pure Oil Co.
†McClanahan P. L. and Simrall.
Midland, Mich., price posted by Simrall Corp. and Pure Oil Co. includes Greendale, Porter, Beaverton, Crystal and equal grades. West Branch and Arenac by Simrall Corp. Eastern Kentucky crude purchased by Ashland Refining Co., Ashland, Ky. Buckeye posted by Simrall Corp. and Pure Oil Co.

West Texas

See gravity table.

Pecos County*	$ .91
Pecos shallow†	.81

*Shell Petroleum Corp., Gulf Pipe Line Co. and Humble Oil & Refining Co. †Shell Petroleum Corp.

Southwest Texas

(Effective January 28, 1937)

Pettus	$1.37
Salt Flat, Darst Creek, Hilbig, Carroll, Clark, Zoboroski	1.09
Lytton Springs	1.12
Luling	1.00

Saxet and Taft take same gravity table as Gulf Coast.

Eastern States

TIDE WATER ASSOCIATED OIL CO.
(Effective March 7, 1938)

Bradford, Pa.	$2.05
Allegany, N. Y.	2.05

SOUTH PENN OIL CO.
(Effective March 7, 1938)

Pennsylvania Grade Oil in National Transit Lines (Bradford field)	2.05
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	1.71
Pennsylvania Grade Oil in Eureka Pipe Line lines	1.65
Pennsylvania Grade Oil in Buckeye Pipe Line lines	1.55
Corning Grade Oil in Buckeye Pipe Line Co.'s lines	1.27

PENNZOIL CO.
(Effective March 7, 1938)

Pennsylvania Grade Oil in National Transit Lines:	
Group A	1.98
Includes, Cochran, Franklin, Hamilton and Doolittle districts.	
Group B	1.97
Includes Tidioute district.	
Group C	1.96
Includes Turkey and Tidioute districts.	
Group D	1.95
Includes Bear Creek and Porkey districts.	
Group E	1.93
Includes Eldeneau, Bull Creek, Rough Run, Carbon, Dipner, Bredlin, McJunkin, Jameson, Kenerdell, Emlenton, Tiona, Lacey and Kinzua districts.	

PURE OIL CO.
(Effective March 7, 1938)

Cabin Creek, W. Va.	$1.65
Bradford Hollow, W. Va.	1.65
Kelly Creek, W. Va.	1.65

Canada

Ontario (Sept. 9, 1933)*

Petrolia	$2.10
Oil Springs	2.17
TURNER VALLEY NAPHTHAS AND CRUDE OIL (January 5, 1938, by Imperial Oil, Ltd.)	
Clear naphtha and discolored naphtha, 65 gravity and higher	$2.14
Discolored naphtha and crude oil, 40-40.9 gravity	1.14
Increasing 2 cents for each degree gravity with top price for 64-64.9 gravity	1.62
These prices f.o.b. producers field tankage.	

*Imperial Oil, Ltd.

Mexico

Heavy Mexican crude	*$.85

*In U. S. currency, f.o.b. ship, based on February spot market transactions.

Crude Oil Price Changes

The Texas Co. has announced a change in its Gulf Coast crude oil gravity schedule of prices. Effective April 1, 1938, the schedule starts at below 21 degrees, 95 cents. It had formerly started at below 18 degrees, 90 cents; 18-18.9, 92 cents; 19-19.9, 94 cents; 20-20.9, 96 cents. No changes were made from 21 degrees upward. It also announces a price of 90 cents per barrel for Eddy County, New Mexico, crude, effective April 1, 1938.

Crude Prices by Gravities

	Oklahoma-Kansas	Oklahoma-Kansas	North and Central Texas	East Central Texas (Mexia district)	North Louisiana-Arkansas	Gray County, Texas	Hutchinson-Carson counties, Texas	Rodessa, Louisiana-Texas and Panola County, Texas	Conroe, Tomball, Raccoon Bend, (Deep) Satsuma	Gulf Coast	Gulf Coast	Lea County, N. Mex. West Texas except Pecos County	Mirando district, Texas	Marion County, Texas	Refugio, Greta, Saxet, Taft, Texas	Anahuac, Flour Bluff, Dickson, Turtle Bay	White Castle, Louisiana	Iowa, Louisiana	Cayuga, Texas
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Bel. 18	....	....	....	....	....	....	....	....	....	$ 95	....	....	....	....	....	....	....	$.90	....
18-18.9	....	....	....	....	....	....	....	....	....	.95	....	....	....	....	....	....	....	.92	....
19-19.9	....	....	....	....	....	....	....	....	....	.95	....	....	....	....	....	....	$.94	.94	....
20-20.9	....	....	....	....	....	....	....	....	....	.95	$ 95	....	$ 96	....	$1.01	....	.96	.96	....
21-21.9	....	....	....	....	....	....	....	....	....	.98	.98	....	.98	....	1 03	....	.98	.98	....
22-22.9	....	....	....	....	....	....	....	....	....	1 01	1.01	....	1.00	....	1.05	....	1.01	1 01	....
23-23.9	....	....	....	....	....	....	....	....	....	1 04	1 04	....	1.02	....	1.07	....	1.04	1.04	....
24-24.9	....	....	....	....	....	....	....	....	....	1 07	1.07	....	1.04	....	1.09	....	1.07	1.07	....
Bel. 25	....	$ 98	....	....	$ 90	....	....	$ 93	....	....	....	....	....	$ 90	....	....	....	....	$ 88
25-25.9	....	1 00	....	....	.92	....	....	.95	....	1 10	1 10	$.78	1 06	.92	1.11	....	1.10	1 10	.90
26-26.9	....	1 02	....	....	.94	....	....	.97	....	1 13	1.13	.80	1 08	.94	1.13	....	1.13	1 13	.92
27-27.9	....	1 04	....	....	.96	....	....	.99	....	1 15	1 15	.82	1.10	.96	1.15	....	1 15	1 15	.94
28-28.9	....	1.06	....	....	.98	....	....	1 01	....	1 17	1 17	.84	1.12	.98	1.17	....	1.17	1 17	.96
Bel.29	$1 06	....	$ 96	$1 03	....	....	....	....	$1 20	....	....	....	....	....	....	....	....	....	....
29-29.9	1 08	1 08	.98	1 05	1.00	....	....	1 03	1 22	1 19	1 19	.86	1.14	1 00	1.19	....	1 19	1 19	.98
30-30.9	1 10	1 10	1.00	1 07	1 02	....	....	1 05	1 24	1 21	1.21	.88	1 16	1 02	1 21	$1 16	1 21	1 21	1 00
31-31.9	1 12	1 12	1 02	1.09	1.04	....	....	1.07	1 26	1 23	1.23	.90	1.18	1.04	1 23	1.18	1 23	1 23	1 02
32-32.9	1¼	1 14	1 04	1.11	1 06	....	....	1 09	1 28	1 25	1 25	.92	1 20	1 06	1 25	1 20	1 25	1 25	1 04
33-33.9	1 16	1 16	1 06	1 13	1 08	....	....	1.11	1 30	1 27	1 27	.94	1.22	1.08	1.27	1 22	1 27	1 27	1 06
34-34.9	1 18	1 18	1 08	1.15	1.10	....	....	1 13	1 32	1 29	1 29	.96	1.24	1.10	1.29	1 24	1.29	1 29	1 08
Bel. 35	....	....	....	....	....	$ 96	$ 91	....	....	....	....	....	....	....	....	....	....	....	....
35-35.9	1 20	1 20	1 10	1.17	1 12	.98	.93	1 15	1 34	....	1 31	.98	1 26	1.12	1 31	1 26	1 29	1 29	....
36-36.9	1 22	1 22	1 12	1 19	1 14	1 00	.95	1 17	1 36	....	1 33	1.00	1 28	1 14	1 33	1 28	1 29	1 29	....
37-37.9	1 24	1 24	1.14	1 21	1 16	1 02	.97	1 19	1 38	....	1 35	1 02	1 30	1 16	1 35	1.30	1 29	1 29	....
38-38.9	1 26	1 26	1.16	1 23	1 18	1 04	.99	1 21	1 40	....	1 37	1 04	1 32	1 18	1 37	1 32	1 29	1 29	....
39-39.9	1 28	1 28	1.18	1 25	1 20	1 06	1 01	1 23	1 42	....	1 39	1 06	1 34	1 20	1 39	1 34	1 29	1 29	....
40,over	1 30	1 30	1 20	1 27	1 22	1 08	1 03	1 25	1 44	....	1 41	1 08	1 36	1 22	1 41	1.36	1 29	1 29	....

Column 1—Companies posting are Barnsdall, Bell, Champlin, Continental, Cushing, Derby, Bay, Eason, El Dorado, Cities Service, Falcon, Globe, Gulf, Johnson, Kanotex, National, Phillips, White Eagle, Stanolind, Sunray, Texas, Sun, Vickers and Wilcox.
Column 2—Anderson & Prichard, Carter, Cosco, Deep Rock, Magnolia, Mid-Continent, Pure, Rock Island, Shell, Sinclair, Skelly and Tide Water.
Column 3—All purchasers.
Column 4—Humble Oil & Refining Co. and Sinclair Oil Purchasing Co.
Columns 5, 6, 7 and 8—All purchasers.
Column 9—Humble Oil & Refining Co. and Sun Oil Co. Tide Water Oil Co.'s schedule starts at 35 degrees, $1.34 with 2-cent spread up to 40 and over at $1.44. (Raccoon Bend prices are for deep sand oil.)
Column 10—The Texas Co. (Gulf Refining Co. pays same prices up to and including 34 gravity, but continues its 2-cent spread up to 40 and over at $1.41.)
Column 11—Humble Oil & Refining Co., Sinclair Prairie Oil Marketing Co., Sun Oil Co.
Column 12—All purchasers.
Column 13—All purchasers (effective July 6, 1937).
Column 14—Magnolia Petroleum Co.
Column 15—Humble Oil & Refining Co. (effective July 6, 1937).
Column 16—Humble Oil & Refining Co.
Columns 17 and 18—Shell Petroleum Corp.
Column 19—Tide Water Oil Co.

Texas Wildcats

(Continued from Page 243)

Wilcox O. & G. Co. No. 1 W. H. Portwood, T.E.&L. Sur. Loc.; 6,000-ft. test.

Clay County

Barnett Pet. Co. No. 1 Ben Nutter, sec. 30, Grayson Co. Sch. Lds. S.D. 4,087 ft.
Walter Gant No. 1 Bryant Edwards, S. C. Beldon Sur. A-12, 6,000-ft. test. Drlg. 4,550 ft.
Healdton O. & G. Co. No. 1 Wallace, Belcher Subd. Drlg. 5,598 ft.
W. P. Luse No. 1 Hapgood, sec. 68, Marion Co. Sch. Ld. 5,000-ft. test; drlg. 4,075 ft.
Joe Rogers No. 1 C. P. Davis, Blk. 6, Montague Co. School Land Sur. A-307, 4,500-ft. test. Loc.
Wood Pet. & Roy. Corp. No. 1 I. H. Kempner, Blk. 44, Bosque Co. Sch. Ld. Sur. A-10. S.D. 2,020 ft.

Cooke County

H. L. Nutting et al No. 1 H. P. Ware, A.C.C. Bailey Sur. A-44. T.D. 2,230 ft.; tstd. water and rainbow 2,216-19 ft.; S.D.O.
Sinclair Prairie Oil Co. No. 1 J. M. Best, T. Toby Sur. A-1054. Drlg. 1,790 ft.
Sunset Oil Co. No. 1 J. T. Donald, S.P. R.R. Sur. A-971. 3,500-ft. test; drlg. 2,465 ft.

Denton County

B. Lee No. 1-B Boyles, S. Ross Sur. A-112. Drlg. 2,240 ft.

Foard County

Texas Co. No. 16 Johnson, sec. 37, S.P. R.R. Sur. Drlg. 2,745 ft.

Jack County

Noah Daves No. 1 K. D. Baker, sec. 2709, T.E.&L. Sur., 4,000-ft. test. Drlg.
Harper Pet. Co. 1 Mary E. Norman, A. Pearson Sur. A-1304. Drlg. 1,370 ft.
R. S. Luke No. 1 H. M. Simpson, J. W. Abbey Sur. A-11, 3,250-ft. test. Loc.
Taubert & McKee No. 1 R. H. Eatherley, G. C. Stanley Sur. A-1653. Drlg. 1,400 ft.

Knox County

King & McCurday No. 1 Hoblitt, H.&T.C. Sur., Blk. 46. Spd.
King & McCurdy No. 1 N. Rogers, sec. 3, H.T.&B. Sur., 4,000-ft. test. Drlg. 900 ft.

Montague County

H. H. Powell No. 1 Arch Durham, W. J. Wagoner Sur. A-936. S.D. 822 ft.
E. J. Ruwaldt No. 1 J. A. Hoffman, T. Puckett Sur. A-607. Drlg. 600 ft.
J. W. Sorrell et al No. 1 J. E. Walthall, Sam. H. Smith Sur. A-662. S.D.O. 2,720 ft.

Wichita County

Bolin & Whittington No. 1 Waggoner Bros., sec. 21, H.&T.C. Sur. Sdy. L. 3,840-62 ft.; 6⅝-in. 3,851 ft.; flowed & swabbed 40 bbls. per hr. and S.D. for R.R. com. test.
C. W. Boller No. 1 S. Y. Collins, Charles Roberts Sur. A-540. 6⅝-in. 3,855 ft.; brkn. sdy. L. and O.S. 3,860-3,900 ft.; W.O.C.

Market Record of Active Oil Stocks

Compiled by Carl H. Pforzheimer & Co., 25 Broad Street, New York City, Member New York Stock Exchange and New York Curb Exchange

New York Stock Exchange

1938 High	1938 Low	Week ending Apr. 9 Sales	High	Low	Close	Stocks—	Total shares outsanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1937	1937 High	1937 Low	1936 High	1936 Low
72½	57	600	63	59⅞	63	Amerada Corp.	788,675	N.P.	50cQ	4-30-38	$2.00	114⅞	51½	125½	75
24	17¾	13,600	20	18¼	20	Atlantic Refining	2,663,999	$25	25cQ	3-15-38	1.00	37	18	35⅛	26⅝
19	12⅛	5,300	16½	13⅛	16⅛	Barber Co.	387,149	$10	75c	12-16-37	1.00	43⅝	10⅛	38½	21
16⅜	10⅛	14,100	13⅞	11¾	13⅝	Barnsdall Oil Co.	2,250,344	$5	25cQ	5-2-38	1.00	35¼	10	28¼	14⅛
10½	7	28,200	9⅜	7½	9⅜	Consolidated Oil Corp.	13,919,417	N.P.	20cQ	5-14-38	.90	17⅞	7	17¼	11½
34⅜	21¼	14,000	27½	23¾	27¼	Continental Oil of Delaware	4,682,583	$5	25cQ	3-31-38	1.50	49	24	44⅞	28⅛
8⅞	5	14,100	7	5⅞	7	Houston Oil (new)	1,098,618	$25	....	10-17-30	....	17⅝	4¾	13⅞	6⅜
22⅝	12¼	3,300	17	14	17	Mid-Continent Petroleum	1,855,912	$10	$1	11-1-37	1.50	35⅝	14	30⅞	17¼
17¾	11	700	12¼	11½	12⅛	Mission Corporation	1,399,345	N.P.	25c	12-24-37	1.25	34	15	29⅞	16¾
23	14⅛	13,700	19½	16½	19⅛	National Supply	382,591	$25	$2 pf.‡	12-22-37	(‡)	41⅝	17⅝	75½	19⅞
14⅞	10	7,900	12⅜	11⅛	12¼	Ohio Oil Co.	6,563,377	N.P.	50cSA	12-15-37	1.00	22⅞	9	18	12⅛
15⅞	10¼	900	12	10¼	11½	Pacific Western Oil	1,000,000	N.P.	75c	12-15-37	.75	29¾	11¾	23½	11¾
9	7	No sales	..	..	..	Pan American Pet. & Trans.	4,702,945	$5	$1 *	12-21-37	1.00	17⅛	7	20⅝	12¼
42½	27¼	16,500	35½	30	35½	Phillips Petroleum	4,449,052	N.P.	50cQ	3-1-38	2.75	64	30⅛	52⅝	38⅛
20	15	4,000	17⅞	16¼	17⅝	Plymouth Oil Co.	1,029,800	$5	35cQ	9-30-37	1.65	29⅞	13	27¾	11⅞
13½	8½	17,500	10⅞	9¼	10½	Pure Oil Co.	3,281.120	N.P.	25c	12-1-37	.25	24⅜	8¾	27⅞	16
7⅞	5	7,500	6¼	5⅜	6	Richfield Oil Corp.	3,285,120	N.P.	25c	12-24-37	.25	6½	4⅛	..	
27½	15½	4,800	21	17¼	21	Seaboard Oil of Delaware	1,224,283	N.P.	25cQ	3-15-38	1.00	54⅛	16	44	30½
18¼	10	9,200	13½	11½	13½	Shell Union Oil	13,070.625	N.P.	50c	12-20-37	1.00	34¾	14⅞	28¼	14¾
34¾	18½	4,100	24	20¼	24	Skelly Oil	1,003,949	$15	50c	12-15-37	1.50	60⅝	26½	47⅜	19½
16⅜	10¾	33,600	14	12⅛	14	Socony-Vacuum	31,151,071	$15	25c	3-15-38	.80	23¼	13	17½	12½
33⅞	25⅛	10,800	28⅝	26¾	28½	Standard Oil of California	13,014,754	N.P.	35cQ†	3-15-38	2.00	50	27⅛	47⅝	35
35½	24¾	9,500	29¾	27	29¾	Standard Oil (Indiana)	15,267,030	$25	25cQ	3-15-38	2.30	50	26½	48½	32¾
35½	32½	100	32½	32½	32½	Standard Oil of Kansas	112,837	$10	$5	12-20-37	5.00	43	30⅝	31	25
54⅛	39¾	29,700	48	42⅝	48	Standard Oil of New Jersey	25,856,081	$25	$1.25SA†	12-15-37	2.50	76	42	70⅜	51⅛
57⅞	45	No sales	..	..	..	Sun Oil	2,316,484	N.P.	25cQ	3-15-38	$1 & 8% Stk.	77½	44½	91	70
3⅝	1¾	6,500	2½	2	2½	Superior Oil Corp.	1,388,079	$1		....	....	7¾	1½	6¾	3
44⅞	32⅝	34,100	40½	35⅜	40¼	Texas Corp.	10,875,006	$25	50cQ	4-1-38	2.25	65⅛	34¾	55¼	28⅞
4⅞	2⅝	5,400	3⅞	3	3⅞	Texas Gulf Producing Co.	888,135	N.P.	10c	12-23-37	.10	9⅝	2	8⅞	4⅜
10⅛	7	6,600	8½	7½	8½	Texas Pacific Coal & Oil	888.237	$10	10c	3-1-38	.40	16⅝	5⅜	15¼	7½
15½	10⅛	9,100	13⅛	11½	13⅛	Tide Water Associated	6,369,175	N.P.	25cQ	3-1-38	1.20	21⅝	13⅛	21⅜	14¾
21⅝	17⅛	3,000	19⅞	18	19½	Union Oil of California	4,666,270	$25	30cQ	2-10-38	1.40	28¼	17½	28½	20¾
23½	20	500	20¾	20½	20¾	Union Tank Car Co.	1,200,000	N.P.	40cQ	3-1-38	1.60	31½	22	31⅝	22⅝
2¾	1⅝	700	2½	2	2½	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	6¼	1¾	5¼	2¾

*Payable in 3½% notes. †Includes extras. ‡One-tenth share $2 preferred stock.

New York Curb Exchange

1938 High	1938 Low	Week ending Apr. 9 Sales	High	Low	Close	Stocks—	Total shares outsanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1937	1937 High	1937 Low	1936 High	1936 Low
9⅝	5	2,400	6¾	5½	6¾	American Republics Corp.	1,308,049	$10	30c	12-27-37	$0.40	10	6⅝	..	..
10¼	5¼	600	6⅞	6⅛	6⅞	Bridgeport Machine Co.	260,000	N.P.	1.25	12-30-37	$2.00	21⅜	7	21	13¼
39	34	150	35	34	35	Buckeye Pipe Line Co.	200,000	$50	75cQ	3-15-38	3.75	51½	36	50	39⅝
110	97	No sales	..	..	..	Chesebrough Mfg. Co.	120,000	$25	$1.50Q†	3-21-38	7.00	123	95½	124¾	105
2	1	46,900	1⅛	1	1⅛	Cities Service	37,804,394	N.P.	....	6-1-32	....	5⅜	1½	7⅝	3
2⅜	1	5,000	1½	1⅛	1⅜	Cosden Petroleum	399,687	$1	....	..	....	5½	1½	4½	1½
27½	17½	8,600	20½	17⅞	19⅞	Creole Petroleum	6,974,356	$5	50cSA†	12-15-37	1.00	38¾	20¼	39	19⅞
8¾	5½	100	7	7	7	Darby Petroleum	351,390	$5	25cSA	1-15-38	.50	18⅝	6½	18⅛	9
3½	2	1,600	2⅝	2⅛	2⅝	Derby Oil & Refining	263,162	N.P.	....	.....	....	8⅜	2¼	6⅝	1⅞
31	22⅝	No sales	..	..	..	Eureka Pipe Line	50,000	$50	$1Q	2-1-38	4.00	47½	24½	47½	38½
42⅞	33	5,100	36¾	34¼	36⅛	Gulf Oil Corp.	9,076,202	$25	25cQ	4-1-38	1.00	63½	33	59	36
70	56	4,200	67	57½	67	Humble Oil & Refining	8,923,935	N.P.	37½c	4-1-38	2.00	87	54⅞	80	57
19½	15	6,500	16	15⅜	16	Imperial Oil of Canada	26,919,871	N.P.	62½cSA†‡	12-1-37	1.25	24¼	14½	24½	19⅝
8¼	6⅝	No sales	..	..	..	Indiana Pipe Line	300,000	$10	30c	5-14-38	.80	15	5⅞	9⅜	5½
31¼	23	8,600	25	24⅛	24⅝	International Petroleum	14,247,088	N.P.	$1.25†‡	12-1-37	2.50	39½	23½	39⅝	32⅝
5	3¼	1,300	3½	3¼	3⅜	Kirby Petroleum Co.	500,000	$1	10c	4-15-38	....	8⅜	2⅜	5⅜	2⅝
25⅛	15⅝	5,700	21⅜	19	21⅜	Lion Oil Refining	434,820	N.P.	50cQ†	12-24-37	1.50	34	12½	17⅜	7⅝
9¼	6⅝	2,200	7	6⅝	7	Lone Star Gas	5,382,723	N.P.	20c	4-20-38	.60	14¼	5¼	14¼	9⅞
9⅜	6½	4,200	7⅜	6⅜	7⅜	Louisiana Land & Exp.	3,000,000	N.P.	20cQ†	12-15-37	.50	15¼	6⅜	15⅜	9⅞
8⅜	6⅜	1,000	7	6½	7	Midwest Oil Co.	998,444	$10	50c	12-15-37	1.00	14⅝	6¼	..	..
5¼	4½	1,300	5⅛	4⅞	5⅛	Mountain Producers	1,682,182	$10	30cSA	12-15-37	.60	7⅞	4⅛	8⅜	5
14⅝	12⅛	1,000	13	12¾	12¾	National Fuel Gas	3,810,183	N.P.	25cQ	1-15-38	1.00	19½	12	23	17⅜
9¼	7⅝	900	8	7⅝	8	National Transit	509.000	$12.50	55cSA	12-15-37	1.00	12½	7¼	15¾	9¼
2⅝	1½	400	1½	1½	1½	New Mexico and Arizona	1,000,000	$1	1c	12-1-36	....	5	1⅛	6⅝	1⅝
4½	4	No sales	..	..	..	New York Transit	100,000	$5	15c	4-15-38	1.00	5⅜	3⅞	6¼	4¼
6	4	No sales	..	..	..	Northern Pipe Line	120,000	$10	25cSA	12-1-37	1.00	12¾	5¾	9¾	4⅞
7⅜	4⅛	25,200	5⅜	4⅞	5⅝	Pantepec Oil	1,608,700	N.P.	.. ..	.....	....	9⅝	2⅜	10⅛	3¼
3½	1⅝	1,000	2¼	2	2⅛	Root Petroleum Co.	336,045	$1	25c	2-1-37	.25	13¾	2	19¼	4½
4	2⅛	1,800	2¾	2¼	2¼	Ryan Consolidated	296,931	N.P.	.. ..	.....	....	6½	2¼	4¾	1⅞
5⅜	3⅜	No sales	..	..	..	Southern Pipe Line	100,000	$10	15cSA	3-1-38	.45	7¼	3⅞	7⅞	3¼
39	28¾	200	31½	31½	31½	South Penn Oil	1,000,000	$25	50cQ†	3-31-38	3.65	56	35	44	32½
22¼	19½	No sales	..	..	..	Southwest Penna. Pipe Lines	35,000	$50	50cQ	4-1-38	2.00	42	20	60	44
18	15	2,600	16⅞	16	16⅞	Standard Oil of Kentucky	2,604,790	$10	25c	3-15-38	1.50	21⅛	14¾	23⅜	17⅛
7½	6⅛	No sales	..	..	..	Standard Oil of Nebraska	166,403	$25	25c	3-29-37	.25	13¾	8	14⅝	11
22	16¼	2,300	18	16¾	18	Standard Oil of Ohio	753,740	$25	25c	3-15-38	1.50	45	16	40	21¾
3¼	2⅛	2,800	2¾	2⅜	2¾	Sunray Oil	1,910,119	$1	10c	12-24-37	.25	4⅞	2	5	2⅝
4⅜	3½	300	4	3¾	4	Texon Oil & Land	336,028	$2	15cQ	3-31-38	.45	7⅝	2	9¾	5⅜
7⅝	4⅝	1,400	5⅞	5	5⅞	Transwestern Oil Co.	750,000	$10	....	.....	....	13⅞	4⅝	..	..
5¼	2¾	11,900	3⅝	3⅛	3½	United Gas Corp.	7,818,959	$1	10c	9-15-37	....	13⅝	3	10¾	4

†Includes extras. ‡Payable in Canadian funds. ‡Of which $1 was in preferred stock.

New or Improved Equipment

Realignment of Departments Is Announced by Westinghouse

The Westinghouse Electric & Manufacturing Co. has announced a realignment of its industrial department. Three new departments, indus-

Q. M. Crater *Phelan McShane*

trial, resale, and industry engineering have been formed to meet changing conditions in industrial markets.

The new industrial department has a staff of field-trained sales engineers, each with broad experience in industry problems. Electrification of industries such as oil, iron and steel, chemical, and public works will be served. C. B. Stainback is manager. Q. M. Crater is manager of the petroleum and chemical section.

The industry engineering department centralizes electrical engineering activities relating to central station and industrial power problems. C. A. Powel is manager. Phelan McShane is manager of the mining, chemical and petroleum section.

The resale department will devote its facilities to servicing manufacturers whose products incorporate electrical equipment and other secondary distribution channels, such as industrial agents and jobbers.

Bulletins, Booklets and Other Literature for the Trade

Five new bulletins are announced by General Electric Co., Schenectady, N. Y.: GEA-2473, describing pushbutton stations and other manual electric controls; GEA-1423A, solenoid-operated valves; GEA-1587C, combination magnetic switch; GEA-2776, gasoline-engine-driven arc welder, and GEA-2704, arc-welding accessories.

A new air-actuated control, developed by Leeds & Northrup Co., 4934 Stenton Avenue, Philadelphia, Pa., is presented in a 12-page catalog, "Micromax Pneumatic Control."

Thirty construction jobs throughout the United States are illustrated and explained in the booklet, "Construction Jobs," obtainable on request from the Cleveland Tractor Co., Cleveland, Ohio.

E. B. Badger & Sons Co., Boston, Mass., is mailing to those who ask for it a 16-page booklet on corrugated-type expansion joints.

"Strength and Design of Covers and Flanges for Pressure Vessels and Piping," a paper prepared jointly by T. McLean Jasper, H. Gregersen, and A. M. Zoellner, research engineers for A. O. Smith Corp., Milwaukee, Wis., has been reprinted in the form of a convenient booklet by the company and is sent on request. The paper appeared originally in Heating, Piping and Air Conditioning.

The Bitumastic visual index is one unit of a program adopted by Wailes Dove-Hermiston Corp., New York, to promote sales of its Bitumastic protective coatings. The index indicates visually what Bitumastic products are recommended for the protection and decoration of all paintable surfaces around an industrial plant.

Along with other interesting matter, the latest number of the Bridgeport Bulletin, published by the Bridgeport Machine Co., Wichita, Kans., contains information concerning the Bridgeport portable rig front.

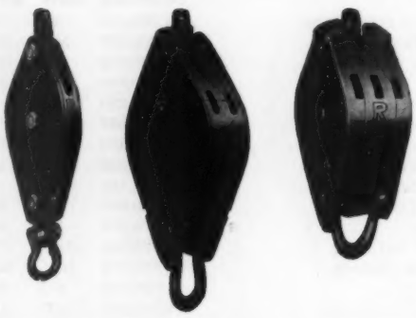
A cloth-bound catalog of Linear mechanical packings, issued by Linear Packing & Rubber Co., Inc., State Road and Levick Street, Tacony, Philadelphia, Pa., contains 112 pages. It gives helpful service recommendations and technical data.

A bulletin prepared by the Hobart Brothers Co., Troy, Ohio, presents detailed information concerning the company's new Multi-Range arc welder, which offers a choice of 1,000 combinations.

Wichita Falls spudders are the subject of a 16-page bulletin announced by Clark Machine Co., Wichita Falls, Tex.

Regan's Line of Tubing-Blocks Has Been Newly Engineered

A newly engineered line of tubing-blocks is being introduced by Regan Forge & Engineering Co. of San Pedro, Calif. The line consists of single-, double- and 3-sheave blocks, in two models. Model 1 is of heavy construction, with stream-



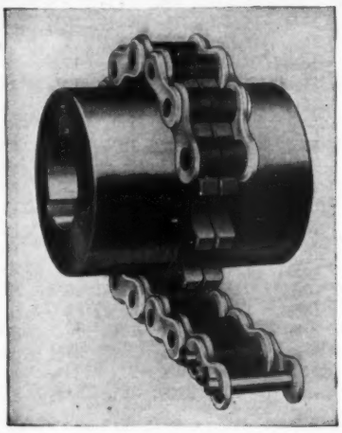
lined cast-steel guards. Model 2 is the lighter series, with fabricated plate guards. All are equipped with roller bearings and chrome alloy steel sheaves. The single-sheave Model 2 has a capacity of 35,000 pounds. Double-sheave Models 1 and 2 are rated at 70,000 pounds and the 3-sheave Models 1 and 2 at 100,000 pounds.

Magnetic Reversing Switches

The marked advantages of combination reversing magnetic switches which employ air circuit breakers have resulted in the development, by General Electric's industrial department, of a new line of such devices. This line, designed as alternative equipment for fused motor-circuit switches, is said to offer space economy and increased safety. The new combination reversing switches are primarily intended for the full-voltage starting of a-c motors. The equipment is particularly suitable where short-circuit protection for individual motors is desirable and as a means of disconnecting the power-supply line to switch and motor.

Major Improvements Embodied in New Link-Belt Coupling

Link-Belt Co., Chicago, Philadelphia, and Indianapolis, has developed a flexible coupling, Type RCB, which embodies major improvements



over the company's Type RC roller-chain coupling long furnished for connecting shafting in line.

The RCB coupling consists of two cut-tooth sprocket-wheels (or coupling halves) connected by a piece of specially constructed single-width finished steel roller chain, using a recently patented divided-roller feature which combines the advantage of double roller chain with the more rugged and simple construction of single-width chain. The divided roller provides independent roller action for each sprocket, and as the contact between roller and sprocket causes the roller to revolve on its bushing, any tendency to scuff the rollers and sprocket-teeth is said to be avoided. Longer coupling life and extension of the range of efficient application are claimed for the new coupling.

Other improvements concern the grease-retaining housing or casing, which, when specified, is furnished for enclosure and automatic lubrication of the coupling. The most outstanding of these improvements is the use of two fittings, 180 degrees apart, inside the housing, to permit packing the housing with grease, without necessity of dismantling.

Size of Piston Easily Changed by Shifting Rubber Sleeves

The Wells convertible slushpump piston is being manufactured and distributed exclusively by the W-K-M Co., Inc., Houston, Tex. The piston is quickly converted from one size to another by merely changing the rubber sleeves. This feature eliminates the necessity of frequent pulling of the pistons from the rods, and it also enables several changes of size at the cost of only the rubber sleeves. Steel parts are of top-grade, heat-treated steel. The steel insert ring, vulcanized to the laminated rubber sleeve, absorbs all the load and insures longer life.

New Attachment for Drillstem Is Offered by National Supply

The National Supply Co. has developed an improved attachment for driving the drillstem and a new design of rotary-slips. The Ideal Type BL

drillstem-bushing is a new departure. It is bolted together and has hardened driving liners of extra length. Instead of driving through the table-bushing, the rotary-table drives the drillstem-bushing directly. The table-bushing for this attachment is specially designed and has an extra-long slip-bowl. The design provides greater driving contact with both the bushing and the drillstem, decreasing wear on both units.

For use in conjunction with the new drillstem attachment are the Ideal Type BK rotary-slips. These slips are extra long, minimizing any crimping of the drillpipe, and are built in a hinged unit. The slip-liners are made of hardened alloy steel and the gripping surface has a myriad of teeth formed by vertically scoring the finely pitched horizontal wickers.

The new drillstem attachment and slips have been especially designed for the Ideal HS-20½ rotary machine and they have been successfully used in drilling the Continental Oil Co. No. 2-A Kern County Land, near Bakersfield, Calif., the deepest well in the world.

Jarecki Opens Store in Electra

Jarecki Manufacturing Co., with home office and factory in Erie, Pa., and general offices in St. Louis, Mo., has opened a new supply store in Electra, Tex., fully stocked with oil-field supplies, including the Jarecki-manufactured line of valves, pipe fittings and oil-field specialties. Jack Cargile is store manager and Paul Carpenter salesman. This is Jarecki's thirty-fifth oil-country supply store.

Here and There With Men Who Manufacture Equipment

J. E. De Long, president of Waukesha Motor Co.; J. G. Swain, sales manager, and Arch Campbell, Mid-Continent manager, spent several days in the Gulf Coast with Portable Rig Co. looking over their installations in that area. Mr. De Long has just returned from a two months' trip in Europe where he visited engine manufacturing plants.

At the annual meeting of Johns-Manville Corp. stockholders these directors were elected: Walter H. Aldridge, Francis D. Bartow, Lewis H. Brown, H. Edward Manville, William R. Seigle, Enders M. Voorhees, George Whitney, and E. T. Stannard. The names of Alfred P. Sloan, Jr., and Clarence M. Woolley were not submitted for reelection at their own request because of the pressure of other duties.

Republic Steel Corp., Cleveland, Ohio, has appointed W. B. Young Supply Co., Kansas City, Mo., jobber for Republic's tubular products. The firm has branches in Hutchinson, Kans., and Joplin, Mo.

Acme Oil Tool Co. Organized

W. E. Bendeler, former sales manager for Baash-Ross Tool Co. in the Mid-Continent, and Cliff Howard, former shop superintendent in Oklahoma City for the same organization, have established the Acme Oil Tool Co. in Oklahoma City. S. W. Florentine, connected with Hughes Tool Co. and Baash-Ross Tool Co. for the past four years, is mechanical engineer for Acme. The new company plans to manufacture a general line of oil tools, including fishing tools, rotary jars, safety joints and overshots, heat-treated subs and rotary drill-collars, and to do general repair service, including drillpipe- and casing-cutting. Mr. Bendeler says all manufactured products will be sold through supply stores.

Green Starts For South America

W. G. Green, vice president of the Seismograph Service Corp., Tulsa, left Tuesday of this week on a trip which will take him to all the countries of South America except two. The trip will occupy a month or six weeks, and Mr. Green will visit as many of the company's clients as possible. After going by airplane to Brownsville, Tex., Mr. Green planned to go by Pan American ship through Mexico City and Guatemala to the Panama Canal Zone; then down the west coast of South America to Santiago, Chile; then flying across the Andes to Buenos Aires, Argentina. The company has one seismograph crew operating in Argentina now in the Comodora Rivadavia district, and it is shipping another unit, which will be used in some other part of Argentina. While in Argentina Mr. Green will visit this party and will make arrangements for the new work to be carried on. He expects to be in Argentina a week or so and then will fly up the east coast to Port of Spain, Trinidad. Four of the company's crews are operating in Trinidad. From Trinidad Mr. Green will go to Maracaibo, Venezuela, where a crew is operating, arriving there about the same time as a shipment of radio equipment, which already is on its way by steamship. Upon installing this radio equipment Mr. Green will leave for Barranquilla, Colombia, where he will catch a Pan American Clipper for Miami via Kingston, Jamaica. He took his movie camera along.

Lane-Wells Bridging Plug Built to Stay Where It Is Placed

The Lane-Wells bridging plug, offered by Lane-Wells Co., 5610 South Soto Street, Los Angeles, Calif., is sturdily constructed as a permanent bridge. It may be run into the hole from a stripped derrick, nothing being required other than a place to hang a hook and plug for lowering the bridge into place. Thus, it is unnecessary to run tubing back into the hole, pour cement and do other expensive work. The bridging plug can be run in 30 minutes.

The bridging plug is run in and controlled by the Lane-Wells gun-perforator service units, and a small electrically ignited charge of powder, controlled by the operator, breaks a frangible clevis. This in turn releases a steel spring, causing the two-way slips to set. It also expands the packing sleeve, freeing the setting head from the plug.

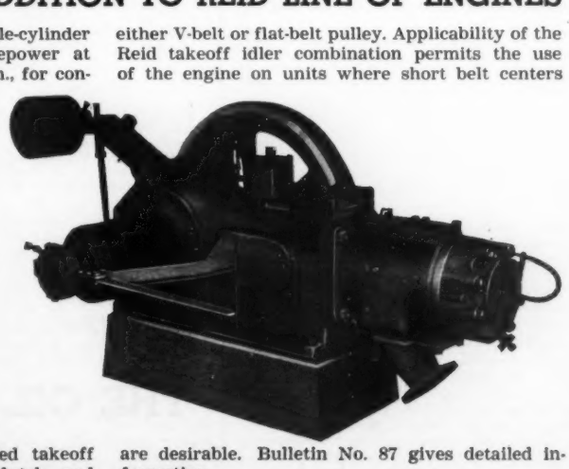
The same accurate measuring and weighing devices used in connection with the gun-perforator are used in setting this bridging plug, assuring positive control and definite depth placement. The plug, according to the manufacturer, always will stay where it is set. Excessive pressures either from above or below tend to set the slips more tightly and it has a synthetic rubber packing sleeve which is practically insoluble in oil or gas. This sleeve, automatically expanded against the casing, is provided with lips on both ends, which cause fluid or gas pressure further to tighten the pack-off. Speed, accuracy and assurance of a complete shut-off, in combination with permanency and sturdiness, are said to commend the plug to operators.

Flint in Houston for Reda

Reda Pump Co., of Bartlesville, Okla., has opened a sales office at 1411 Second National Bank Building, Houston, Tex. This new office will be in charge of F. Rees Flint who has been associated with the company in the service department since 1934. Before that time he was with the Phillips Petroleum Co. The new office has been necessitated by increased oil activities and the desire of the Reda Pump Co., manufacturer of the Reda electrical centrifugal submergible oil-well pump, to widen its service.

"TERRIER" IS NEW ADDITION TO REID LINE OF ENGINES

The Reid "Terrier" 7½x9-inch single-cylinder horizontal gas engine, rated 14 horsepower at 250 r.p.m. to 30 horsepower at 550 r.p.m., for continuous operation, is the latest addition to the line of oil-field engines offered by Joseph Reid Gas Engine Co., Oil City, Pa. The engine has Timken main bearings, and includes many features of design incorporated in all Reid engines. Controls are conveniently mounted in one assembly and all are readily accessible. The engine is entirely enclosed, dust-proof and oil-tight. Features of the design include removable cylinder-head, metallic piston-rod packing, patented crosshead clamp connection, and rotary type magneto. The engine is furnished as a standard engine with two flywheels for attaching the conventional type clutch rig, or with one heavy flywheel and the Reid patented takeoff with Timken bearings, Reid cone clutch and either V-belt or flat-belt pulley. Applicability of the Reid takeoff idler combination permits the use of the engine on units where short belt centers are desirable. Bulletin No. 87 gives detailed information.



CLASSIFIED ADVERTISING

Patent Attorneys

JACK A. SCHLEY
PATENT LAWYER
Patents obtained — infringement practice in all Courts—oil field experience. 1807-11 Tower Petroleum Bldg., Dallas. 2014 Second Nat'l. Bank Bldg., Houston. 707 Insurance Building, San Antonio. 433 Munsey Building, Washington, D. C. Address any of these offices.

PATENTS — TRADE MARKS
All cases submitted given personal attention by members of the firm.
Form "Evidence of Conception" and instructions
"How to Establish Your Rights"—Free
LANCASTER, ALLWINE & ROMMEL
Patent Law Offices
418 Bowen Bldg. Washington, D. C.

For Sale—Maps

WILDCAT MAP
OF
TEXAS
AND
Eastern NEW MEXICO
Up to Date Wildcat Data Monthly
Single Issue $3.00
3 Months Special Offer $7.50
ZINGERY OIL MAP COMPANY
Fair Bldg. Fort Worth, Tex.

Leases and Drilling Blocks

LEASES—ROYALTIES near Ordovician wildcat semi-proven offers reasonable chance play safe quick money. E. CROFT, PROCTOR, TEXAS.

SECURITY ABSTRACT COMPANY
El Dorado, Arkansas
Fee, Lease & Mineral Ownership
on short notice. Ownership maps.

YOAKUM CO., Texas, 10 year oil lease for sale, $15 bonus, $1 acre delay rental on 320 acres consisting south quarters Sec. 596 and 597, in tract 2 miles long, ¼ mile wide, traversing seismograph high in very favorable sector soon to be drilled. This lease may guard your interest on this structure. Dr. J. A. Robinson, Vets. Adm., Los Angeles, California.

OIL PRODUCTION FOR SALE

Approximately 30 bbls. gross settled production, Bartlesville and Peru sands, Creek County, Oklahoma. 5 wells, 360 acres leases, several good undrilled locations. Good lease houses and equipment. Price $25,000.00. Address Box J-342, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES and Royalties bought and sold. Address V. V. Bull, 404 Exchange Bank Bldg., El Dorado, Arkansas.

FOR SALE

50,000 acres leases near Nesson Structure in N.W. North Dakota where California Co. now drilling test.

Write Lock Box 214,
Williston, North Dakota

FOR
SOUTH GEORGIA
Oil Leases and Royalties
Write
C. W. DEMING, Registered Dealer
Hinton Building, Waycross, Georgia.

FOR SALE: Production, leases and drilling propositions in blocks of 200 to 400 acres, near producing oil wells. W. P. Harley, Bowling Green, Kentucky.

LEASES, Royalties and drilling blocks throughout present hot play southern Arkansas. El Dorado Oil Exchange, Garrett Hotel Building, El Dorado, Arkansas.

2400 ACRES five year commercial leases solid, North Central Texas, geology by recognized consulting geologist, tests now being drilled close to east and west lines are below 1200 ft. scheduled 2500, will make equitable drilling agreement with financially responsible persons. Geo. Patterson, 416 West 10th St., Dallas, Tex.

Leases and Drilling Blocks

TEXAS OIL PROPERTIES, producing leases, proven acreage, commercial and drilling blocks geological reports contour maps. Producing Royalties producing oil payments. Goggans Brothers, Licensed Oil Operators, Waggoner Building, Wichita Falls, Texas.

KANSAS Oil Leases Wholesale. 40 acre tracts. All active counties. MARGARET HAYNES, R. No. 3, N. Topeka, Kansas.

ARKANSAS Oil Properties bought and sold. Long Distance No. 9, Tri-State Oil Co., Exchange Bank Bldg., El Dorado, Ark.

FOR SALE: Selected oil leases, Illinois basin. 8 years to run. L. Livingston, 5057 Enright Ave., St. Louis, Missouri.

New Mexico OIL LEASES WHOLESALE
40 acres at a time.
Roy G. Barton, Clovis, New Mexico.

SELL or DRILLING deal wanted. 200 A. deeded, Osage Oil Field, Weston Co., Wyoming. Box 174, Stanton, Nebraska.

Situations Wanted

PIPE LINE, survey party or dredging work wanted by experienced man, anywhere in North or South America. Address Box J-352, The Oil and Gas Journal, Tulsa, Oklahoma.

COMBINATION GEOLOGIST AND LAND MAN wants position with independent operator, well contractor, or small oil company on interest and salary basis, but will consider straight salary.

Graduate of Universities of Texas and California. Speak Spanish fluently. 37 years old. Married. Perfect health.

12 years' experience in doing surface and sub-surface geology, magnetometer mapping, seismograph geophysics, valuation, land leasing, and title curing.

Have had good success buying leases and royalties from Mexicans, Negroes, farmers and ranchers. I speak their language.

Have drilled many wells of my own and I understand well samples, Schlumberger logs, paleontology, well shooting, lease operation, petroleum engineering, and surveying.

Have wide acquaintance in oil fraternity of Southwest and Northwest Texas and fair acquaintance in Midland, Fort Worth, Dallas and Houston.

Prefer Texas and adjoining states.

Address: GEOLOGIST, 1126 Waverly Street, San Antonio, Texas.

PETROLEUM Refiner and Chemist. M. S. degree. Complete plant experience, 6 years in asphalt and road oil processing. Address Box J-351, The Oil and Gas Journal, Tulsa, Oklahoma.

Situations Wanted

A-1 Warehouseman and production clerk desires foreign job. Presently employed past 10 years with major oil company. White, 107 N. Moody St., Victoria, Texas.

ACCOUNTANT, employed, thoroughly experienced oil taxes, accounting, auditing, desires change. Consider 30 days special work. Story, Birdwell Hotel, Dallas.

GRADUATE ENGINEER, eight years' experience refinery, piping, concrete, steel designs, surveys, and construction. Available interview Oil Show. Go anywhere. Address Box J-356, The Oil and Gas Journal, Tulsa, Okla.

Help Wanted

WANTED—MUD ENGINEER with chemical knowledge of clays and sales ability to contact oil well drilling field. Write giving qualifications. 603 Law & Finance Building, Pittsburgh, Pa.

CHIEF INSPECTOR for Tube Mills, experienced with oil country goods, boiler tubes, standard pipe, etc. Give complete details, experience, salary required. Address Box J-334, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION DEPARTMENT MANAGER

Wanted by progressive organization a man experienced in acquiring leases, producing leases and supervising their development and production. Knowledge of Texas and Louisiana fields particularly desirable. State experience in detail, age and salary in last position. All replies will be treated confidential. Address Box J-340, The Oil and Gas Journal, Tulsa, Okla.

WANTED foreman for plate shop. Must be able to do layout work and welding, also handle men. State age and qualifications. Address Box J-341, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION DEPARTMENT MANAGER

Wanted, a man experienced in acquiring leases, supervising their development and production. Experience in Texas and Louisiana fields particularly desirable. State in detail experience, age and salary in last position. All replies must be by mail and will be treated confidentially. Reply to Crown Central Petroleum Corporation, P.O. Box 1759, Houston, Texas.

WANTED — Refinery Operator experienced in modern lubricating oil processes and capable assuming responsible position in large established company, must speak German and willing to reside in Germany. Give complete personal data and experience in detail, which will be held in strictest confidence. Address Box J-353, The Oil and Gas Journal, Tulsa, Oklahoma.

CLASSIFIED DISPLAY RATES

Classified Display is set with a border and may be used in one or two column sizes.

1 Inch	*1 time*	*$5.00*
1 Inch	*13 times*	*4.50 per inch*
1 Inch	*26 times*	*4.00 per inch*
1 Inch	*52 times*	*3.50 per inch*

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

CLASSIFIED

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgement is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	*$1.05*	*$1.80*	*$2.55*	*$3.30*	*7 Lines*	*$2.45*	*$4.20*	*$5.95*	*$7.70*
4 Lines	*1.40*	*2.40*	*3.40*	*4.40*	*8 Lines*	*2.80*	*4.80*	*6.80*	*8.80*
6 Lines	*2.10*	*3.60*	*5.10*	*6.60*	*9 Lines*	*3.15*	*5.40*	*7.65*	*9.90*
5 Lines	*1.75*	*3.00*	*4.25*	*5.50*	*10 Lines*	*3.50*	*6.00*	*8.50*	*11.00*

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

For Sale—Equipment

USED EQUIPMENT

Offered subject to prior sale and to price change without notice.

BUSINESS BUILDING
Good frame 25' x 80' store building with modern living quarter second floor and several fenced lots. Suitable for supply store, trucking warehouse and yards, used equipment or salvage business, etc. Located at 723 East Walker St., Breckenridge, Texas. Contact H. W. Young, telephone 836 Breckenridge.

PIPE MACHINES
No. 3 Williams Pipe Threading Machine to handle 2" to 4" pipe. No. 12 Duplex No. 5175 Bignall & Keller pipe machine with 6" to 12½" inclusive Landis heads. Offered separately or may be purchased with 24' x 24' steel building, 50' x 100' fenced lots, cranes and other equipment used in pipe repair shop. Contact H. W. Young, 1200 East Lindsey Street, Phone 836, Breckenridge, Tx.

DRILL PIPE AND TOOL JOINTS
2,878-feet, almost new, 5⅛" OD. 22.20-lb. A.P.I. Full Hole Drill Pipe with Reed Shrink Grip Tool Joints installed. This excellent pipe and joints is offered at a very attractive price f.o.b. Wichita, Kansas. Ph: 2-1431 or LD-59.

RUBBER BELTING
One piece 95'3" long, 16" wide, 10-ply, folded edge transmission belting. This is in good condition and we guarantee service commensurate with the price of $140 f.o.b. Wichita. Ph: 2-1431 or LD-59.

LEASE BOILERS
(1) 45 h.p. Acme and (2) 45-h.p. Farrar & Treft Boilers all reconditioned and complete with good stacks and handhole plates. Especially recommended for oil treating and general lease service. Price each: $275 f.o.b. Wichita. Ph: 2-1431 or LD-59.

DRILLING CLAMPS
Set of Mechling Extra Heavy, Wire Line Drilling Clamps as good as brand new Clamps. Price: (less liners) $30 f.o.b. Kermit. Ph: 106. Other makes at various stores as low as $10 per set.

ROTARY DRAW WORKS
8" Model 78-A Johnston Gumbo Buster Draw Works with 7" Line and 8" Drum Shaft, 12" Brake Flanges, 3-Steel Jack Posts, Babbitt Bearings, Chain Guards and American Automatic Cathead. Regular type (not unitized). Good condition throughout and well worth $2,750 f.o.b. Corpus Christi. Ph: 574 or LD-31.

ROTARY ELEVATORS
4½" OD Byron Jackson, Wilson Type, Regular Center Latch Rotary Elevator in good serviceable condition at $75 f.o.b. Kermit, Tex. Ph: 106.

PUMPING ENGINE
25-30 Bessemer Open Type, 2-cycle, Gas Engine with 16" dia. x 18" wide Oilwell Bronze Bushed Reversible Clutch. Needs some repair. Price "as is" $150 f.o.b. Wichita. Ph: 2-1431 or LD-59.

STEEL ROTARY HOSE
3" x 45' Champion-Barber All Steel Rotary Hose. Has been reconditioned and tested. Price: $50 f.o.b. Corpus Christi. Ph: 574 or LD-31.

ELECTRIC MOTORS
7½ h.p., 440 volt, 60-cycle, 3-phase, induction type, 1140 R.P.M. at full load, Allis-Chalmers and Westinghouse. Guaranteed first class condition. Price each: $90 f.o.b. Wichita. Ph: 2-1431 or LD-59.

MUD PUMPS
12" x 6¾" x 16" Type F, Johnston Gumbo Buster Slush Pump mounted on Steel Skids with 10" suction and 10" gate valve made up. This pump is in reasonably good condition and can be made as good as new with a few replacement parts. Very cheap price f.o.b. Odessa. Ph: 683 or 684.

ROTARY REAMER
7⅞" to 8½" Reed Single 3-point, Model 31 with good used cutters, 4½" A.P.I. Joints. Reamer is as good as new, cutters good for considerable service. Price: $50 f.o.b. Kilgore. Ph: 52 or LD-1.

THE BRIDGEPORT MACHINE COMPANY
Wichita, Kansas, and Branches.